WILD LIFE of ORCHARD & FIELD

by

ERNEST INGERSOLL

Bradshaw H Swales.

April 13, 190

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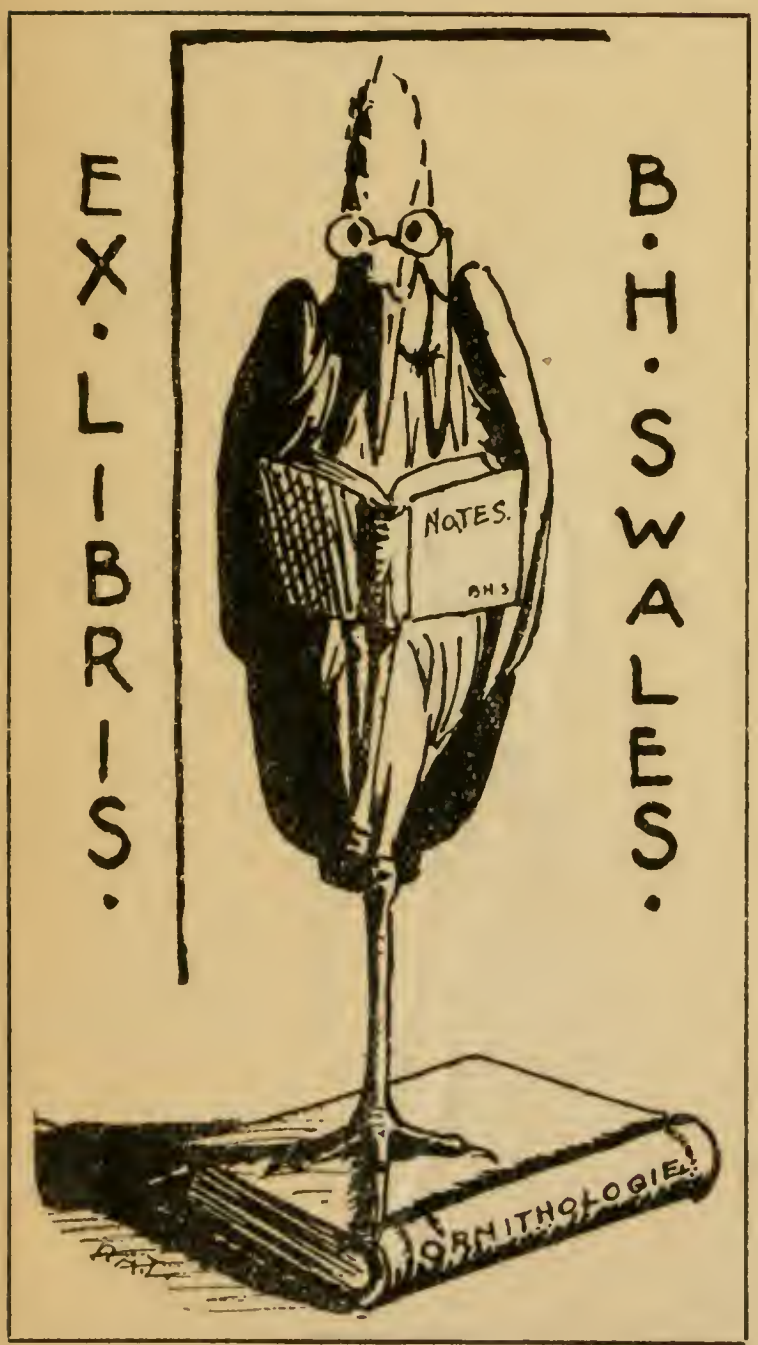

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An Inquiring Woodchuck

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WILD LIFE of ORCHARD and FIELD

PAPERS ON AMERICAN ANIMAL LIFE BY

ERNEST INGERSOLL

AUTHOR OF "NATURE'S CALENDAR" etc. etc.

Smithsonian Institution
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ILLUSTRATED FROM PHOTOGRAPHS

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March, 1902.

Preface

THIS book has grown out of an attempt by the author to make a revised edition of his *Friends Worth Knowing*, a small volume published by Harper & Brothers nearly twenty years ago. This process, however, soon involved so many changes, called for by increase of information in this ever-advancing department of knowledge, that it seemed best to cast the whole matter, old and new, into an entirely fresh form, with illustrations, photographed from life, and a new title.

A large part of this material originally appeared, more or less in its present form, in such periodicals as *Harper's Monthly* and *Harper's Bazar*, *The Century* and *St. Nicholas*, *The Popular Science Monthly*, *Lippincott's Magazine*, *The Outlook*, *The Field*, of London, and some others. The author gratefully acknowledges the courtesy of the publishers of these articles in allowing him to reprint them, with such revision as seemed desirable.

NEW YORK, *January*, 1902. E. I.

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WILD LIFE OF ORCHARD AND FIELD

I

SMALL DEER

THERE is always the pleasure of surprise in the sight of a truly wild animal, or of its traces. We have become so habituated to the idea that the world—or, at any rate, our part of it—has been thoroughly tamed, that there is salt, as the French say, in the thought that somewhat of the primitive and savage is yet left to us. I remember very well the astonishment of a suburban housewife at finding a shrew one morning in a tin pail left out over night. She had never dreamed that there existed so tiny a mammal, much less that it dwelt in

her garden. It was so small she could hide it in her closed hand—all except a long, flexible, proboscis-like nose, pink and tender, that waved about and up and down like a miniature elephant's trunk, and was plainly the creature's chief bureau of information. The fur was blue-gray and exquisitely soft—velvet is rough in comparison; the ears close set, the tail short, and the white feet, each toe perfectly modelled, so delicate that a magnifying-glass was needed to fully display their beauty.

A few nights afterwards two others were taken in a similar unintended and unbaited trap. Both were dead, although entirely unhurt. Did they die simply of fright? There seems to be no other explanation; yet it "comports not well" with the shrew's courage and endurance. Shrieking like an angry vixen, it will face fearlessly and fairly whip the heavy field-mouse; and in captivity it is necessary to keep these morsels of pugnacity apart or they will fight incessantly, and, if possible, kill the weaker of their fellow-prisoners. Their teeth, set in an even row round their jaws, are like needles, and can pierce and hold the most slippery beetle or liveliest worm.

Shrews are really very common, and in the warmer States extremely numerous, but they rarely

come abroad except at night from their homes under logs and stones, where they creep out through tiny tunnels among the grass and beneath fallen leaves that sharp eyes only may trace. One more often picks up their dead bodies in the woods than those of any other mammal—gashed by sharp teeth or claws, very likely, but uneaten. These have been struck down by some owl or weasel or cat, and then rejected in disgust, for they possess a vile odor. Ignorant or careless that they are an important part of nature's police against injurious insects, the farmer usually crushes the shrew beneath his heel as he would a mouse whereever he finds it; and in some parts of the country the European superstition still lingers that shrews will poison cattle by biting them, or will give them lameness by running across a limb.

Shrews grade through intermediate forms into the moles, whose lives seem the most circumscribed and uneventful of all quadrupeds. It is a hard fate that has driven these creatures underground, for they are given no easement of these conditions, are never permitted to come outside at all, where their powerful fore-limbs and wonderful armature of digging claws are as useless as they are grotesque. Yet the distance anatomically is small

between these helpless, shapeless delvers after earthworms and the marvellously agile bats, that, by a modification of the forelimbs at the other extreme, flit and tumble boozily about us in the dusk, or chase dodging moths by the light of the moon. Country people warn you that should a bat get into your hair dreadful things would follow; but who has had such an experience? I feel that the thatch of *my* head is safe from such intrusion —as safe as are my ears from invasion by devil's-darning-needles. By-the-way, did one ever see a bat catch a dragon-fly? That would be an acrobatic performance worth risking much malaria to witness. Swallows can do it.

Most small mammals, in fact, are mainly nocturnal, owing to the competition of more powerful beasts, that has acted against them in a double way—first, by direct antagonism; and, second, indirectly, by forcing the prey of the smaller and weaker brethren into a nocturnal life. The reaction of this, however, compels the larger ones to hunt principally during the darker hours.

This is one reason why we meet so few of the woodland quadrupeds in our walks. Not many, to be sure, are there to be seen, even if we did not scare them out of sight by our noise. They can

Red Squirrel

avoid our eyes well enough in most cases simply by remaining quiet. That is the self-protection of the earth-colored rabbit. A gray squirrel, flattened on the bark of a tree-trunk, his tail extended like a broad feather, is usually safe when quiet, but this is never for any length of time, for his nervousness and curiosity are beyond holding in. Your eye catches a ripple of light, and you know that an irrepressible wave of energy has insisted upon expression, and the next instant the gray is on the opposite side of the tree, with only a sooty nose and ear visible, and an eye like a big jet bead. The red squirrel will control his emotional tail better, but if his patience is tried too long a burst of chattering c-r-r-r-r-r-acks the silence of the grove.

Though the tree-squirrels will never sit still long under your gaze, the chipmunk will sometimes do so, apparently with as studious an interest as you take in him. A young lady described to me lately how one day last summer she was sitting on a stone wall, when a chipmunk crept out of its crevice near by and sat perfectly quiet, watching her with the utmost intentness. Her casual movements startled him a little from time to time, but he never took his eyes off her,

until at last she became so uneasy under his uncanny scrutiny that she ran away to escape it. This was a quaint reversal of the old notion of the human eye being able to stare a wild animal into submission.

An acquaintance surprised me the other day by the question, "What is a chipmunk — how does he differ from a squirrel?" I thought everybody knew this gay sprite of the road-sides. He is a true squirrel, about the size of the common red one, and of the same reddish tone, which, like his brother of the trees, is much brighter in winter than in summer, when the long, warm, handsome fur, suitable for cold weather and the nuptial time, is replaced by a warm-weather suit of a cooler, shorter, and paler sort. His distinguishing marks are two white stripes along the side of the back from the fore-shoulder to the root of the tail, each bordered by a black line, making him the prettiest of our lesser quadrupeds, and giving to him, as with erect ears and trailing, bushy tail he scuds along the fence or scampers in and out of a brush-pile—for he is a true ground-squirrel, rarely going even upon the trunk of a tree—an air of dandy pride and alertness that is most engaging. In the Far West there are four-lined and checkered ones.

Our chipmunk is the familiar of the old stone wall, and where, in some parts of the country, these are disappearing, the chipmunk is disappearing too, while many a skunk and woodchuck also find themselves dispossessed.

How interested in you any wild creature becomes when he finds you in the novel attitude of complete quiet! I was once lying upon a rock at the wooded edge of Tidyaskung Lake, in Pike County, Pennsylvania, closely observing the persistent effort of a small water-snake to drag out from among some stones a large sun-fish, when I suddenly became aware that I, too, was under observation. A mink was standing not six feet away, his head turned on one side and his bright, black eyes regarding me intently. Probably he had had designs on the snake and its prize when his nose, rather than his eyes, detected my presence. I scarcely lifted an eyelid, and slowly one small, velvety, black paw was raised and set noiselessly down after the other as he crept a little forward, as though to get a better view. So I watched him and he watched me —what a chance it would have been for that new order of sportsmen, the field photographers!—his round head with its great, bead-like eyes, the sensitive nostril sniffing the air suspiciously, the

lithe body tense and ready for a spring, one paw held up like an eager terrier's, and wonder shown in his whole pose. I suppose I made some involuntary movement, and he vanished into the shadow of a thicket, out of which sprang like a rocket a startled woodcock!

Such inquisitiveness is characteristic of nearly all animals, but especially of the squirrel kind. Prairie-dogs and gophers will come out of their holes when they hear an approaching footstep and "sit up" on their hillocks, barking with excitement till the last minute they dare, to see what the intruder into their domain is about. Red squirrels will creep along a fence-rail or log to get a nearer view of you as you sit eating your luncheon, then scud away in a burst of panic and chatter when you turn your head; and the curiosity of the big gray is notorious.

It is amusing to see this fellow slide down a tree, with wide-spread legs and outstretched head, by slower and slower advances, while some creature —perhaps a sleepy dog, perhaps a poet weaving his rhymes or a girl her daisy chain—rests quietly at its roots. I have seen a brave old gray go almost within touch of such a figure before some chance motion would alarm it, and the next instant an

indignant bunny would be hurling invectives, jerking his plume-like tail viciously the while, from the security of a lofty perch.

This inquisitiveness, which leads animals to try to examine closely anything strange, is taken advantage of by the larger beasts who seek them as food. The puma of the Pampas, when he is hungry for a dinner and has found a herd of guanacos, simply lies down and lets his presence become known. The foolish guanacos circle about nearer and nearer, craning their long necks, until they have come within leaping distance, and the great cat strikes one down. So "rats and mice and such small deer," and less often the wide-awake squirrels, fall victims to serpents by approaching too close in order to study the reptile, which they seem not to recognize and flee from until struck at; at any rate, a mouse placed in a cage with a captive snake rarely exhibits any fear or distrust. This is an instructive fact, and goes against the prevalent belief that all wild animals have an intuitive dread of "natural enemies"; Professor Lloyd Morgan and other experimenters have shown, indeed, that very young chicks are no more moved by the appearance of a hawk than by that of their own mother. A man can make

friends with young animals as easily as not if he behaves gently. I once picked up and brought to camp an elk calf so large I could hardly lift it without its showing the slightest resistance or apprehension, and patient and sympathetic persons easily make friends with some of the liveliest denizens of the forest. One of the accompanying illustrations shows the friendly relations established between some sojourners in the White Mountains and a family of chipmunks, which came familiarly to these persons for food, and were photographed in a dozen pretty "poses." Many similar friendships of the summer woods might be cited.

A lady who lives near Boston wrote me not long ago of a female gray squirrel whose confidence she had won in this way. "It was not only for the nuts I gave her," says my correspondent, with proper pride, "for she would stop eating a nut to come down the tree-trunk, spring on to my arm or shoulder, and let me carry her along the street for a quarter of a mile." This squirrel would sit beside the lady on the piazza-steps, curl up in her hands or lap or the bend of her arm, and stay quiet until put on the ground and told to go home. She would come in at the window, cross the room and

A Friendly Chipmunk

climb upon her friend's knee, and often followed her some distance down the street, barking softly if the lady did not speak to her or stroke her back. The same squirrel brought her babies one day to show them to her host, although it cost her an hour of coaxing to persuade them to follow her from the brush-protected fence across the drive-way to the porch. Any one who has watched the patient, anxious way in which the squirrel-mothers (for the fathers are away at this time disporting themselves, heedless of domestic cares) encourage their youngsters to venture out upon the shaky limbs, and instruct them in general, can well understand the relief of this little mother when she had brought the kittens safely to the side of their protectress. How human it was! At another time several squirrels used to come to this lady's window, where she fed them, and they had a habit, when climbing about her, of nibbling her ears. "It is never painful or rough," she writes, "but is evidently a caress." Such, no doubt, were their endearments to each other.

The popular notion that squirrels of all sorts subsist wholly on nuts arises from limited, not to say careless, observation. Their food is widely varied in the course of a year, especially in the

spring and summer. Indian corn in the milk suffers more from squirrels than from raccoons or muskrats, which are proverbially so fond of it. In places on the Western frontier an expensive system of watching has had to be maintained at times against this pest. One dainty in late summer is the mushroom, of several varieties of which they are fond; and this reminds me of a bit of unexpected sagacity in one of the Western chipmunks lately spoken of in my hearing by an observer of it. It appears that this chipmunk depends for its ordinary fall and winter fare upon the seeds of the piñon pine, which it preserves by storage in its holes in decayed stumps or underground. It happened lately, however, that in a certain area of the Northwest the piñon crop was a complete failure, and the ground-squirrels were compelled to find something else for their subsistence and winter stores. In this extremity they turned to the mushrooms, everywhere abundant, and were busy during all the late autumn in gathering them. They were too wise, however, to store them underground, where they would soon have rotted, but instead deposited them in notches and crotches of the lower branches of the forest trees, where they dried in the open air and so kept in good condition

to be eaten. Their shrivelling up and the shaking of the branches by the winds caused many to fall, and these the squirrels industriously picked up and tried to fasten more securely to the branches.

This method of providing themselves with winter food implied the necessity of their coming forth from their underground retreats, no matter how cold and snowy the weather, whenever they wanted something to eat, instead of having their larder in-doors as is usual with them; and it would be interesting to know whether they actually did so, or whether they failed to profit, after all, by their seemingly sagacious prudence.

The worst enemy of the squirrels, chipmunks, and all other "small deer" in the Eastern woods is the weasel, of which naturalists distinguish two or three species, until lately confounded and even regarded as identical with the European ermine. To him day and night are alike, winter has no terrors, and all castles are unlocked. He does not need the opportunity offered by the farmer's poultry-yard to enable him to live merrily in the midst of civilization.

The civilization of the country, indeed, has worked to the advantage rather than otherwise

of most of the lesser mammals, which are favored by man's operations in various ways. For the raccoon he cultivates miles of rows of sweet corn, and for the woodchuck provides a vast expanse of grass-land and garden-patches. He has fought for the opossum and the skunk the battle of the weak against wildcat and wolf, and has enabled the former to extend its domain east of the Hudson River, where it was not primitively known—that great stream having proved an apparently insurmountable barrier to the spread of our comical little marsupial; and for both of them he nurtures a vast increase of insect-food and sundry luxuries that the woodland bill of fare did not often afford. The porcupine he tolerates as an amusing companion of his woodcutting, sugar-making, and fishing camps, and for fox and weasel the farmer's wife rears excellent poultry. It is for the mink and otter, among other beneficiaries, that governments stock and restock their brooks and ponds with fish, while corporations dig canals and maintain reservoirs at great expense to make the most satisfactory of homes for the muskrats. Who shall say men are not kind to the lesser animals!

There are animals, as I am again reminded by

the kindly critic looking over my shoulder, that everybody hears about and few see, and perhaps would not recognize when they did. But surely every one would know a 'coon — that comical little rascal, weighing about as much as a house-cat, and, like him, wearing a long, grizzled fur, with the hairs standing out as if blown apart by the breeze, but having the round, fat, loose shape of a well-fed bear. Like a bear, too, it walks on the whole sole of its flat, black-stockinged feet, which brings its body close to the ground, and half the time it is sitting up on its broad stern like a portly squirrel. The long tail is marked by a succession of black rings, and the sharp nose and bright eyes, set in striped fur, give it the cute, intelligent look of a fox.

Raccoons live in holes in trees (where they remain out of sight most of the daylight hours) and are properly arboreal animals, as we know from the veritable story of Colonel Davy Crockett; but at night they come down to raid the farmer's corn-fields, and in wilder regions to steal along the banks of woodland streams in search of crabs and mussels, and (by the sea) of oysters. All these things they handle in their fore-paws with the cleverness of a monkey, and, whenever they can, carry

them to water and wash them well before eating them.

"It is pleasant," says Rowland Robinson, "to see the tracks of this midnight prowler, this despoiler of cornfields, imprinted in the mud of the lane or along the soft margin of the brook, to know that he survives, though he may not be fittest. When he has gone forever, those who outlive him will know whether it was his quavering note that jarred the still air of the early fall evenings, or if it was only the voice of the owl."

The opossum, too, is a woodland animal, rather less nocturnal than the 'coon, and, like him, fond of fruit and insects and crabs; but he has neither the strength nor cleverness that enable his larger companion to get so varied a fare. He is smaller than the 'coon, about twice as big as a rat, and shaped much like one, which he further resembles in having a long, naked tail. The prolonged, flexible nose and the tail, however, are pinkish white, and the latter has the prehensile quality of some monkeys' and snakes' tails, curling round any support at the tip so firmly that the creature can hang and swing by it, thus giving it a fifth hand. It is a queer, whitey-gray, antique-look-

ing little creature, not only largely nocturnal in its habits, but shy and quick to conceal itself on the farther side of a limb or tree, where its gray color enables it to escape observation.

The muskrat, on the other hand, is a brown, aquatic rat, with a naked, scaly, somewhat flattened tail, adapted to scull him along in swimming and diving, and teeth almost as strong for gnawing as those of his cousin, the beaver. He thrives upon man's bounty, in spite of the fact that he is persecuted and chased by many persons with many motives. To some it is sufficient that he is a wild animal—game—something provided by Providence for boys to stone and shoot; to others his skin has a prospective value; and a third class tries to destroy him because he misuses human hospitality by undermining embankments, boring holes in dams and canal banks, and catching captive fish. Nevertheless, the muskrat maintains his tribe in every part of the country.

He lives in a fine home underground, at the extremity of a hall-way ten, twenty, or even thirty feet long, which opens upon a stream bank usually by two doors, one about the level of low water, and the other near high-water mark. Besides this there is usually an inland opening (for ven-

tilation or escape?) which the musquash, like the woodchuck, has learned to hide within a clump of bush or grass. Here, when the spring begins to grow warm, are born six or seven young, and here they stay until their mother thinks them strong enough to begin to go abroad and to learn to swim, an accomplishment they must be taught in spite of the aquatic habits of the species; but so must a seal, for that matter. This they cannot do until midsummer, when they are half grown. A Western gentleman of my acquaintance tells how once, early in July, at the time of a most unusual flood, he saw a family of muskrats that had been driven from home attempting to reach a place of safety. There was a mother and five kittens, each about the size of a barn-rat, holding by the laboring mother's fur with their teeth in evident fear and distress. She made her way slowly and cautiously along the shore, carefully avoiding obstructions and swift water. A fool of a boy hurled a stone which struck the poor creature and scattered her young, and it was with the utmost difficulty the kittens (who knew nothing of diving) were able to reach the near-by reeds, where they were easily captured. The only person I ever heard of catching a full-grown muskrat in that

A Muskrat's Winter House

manner was that wonderful man Thoreau, who makes the following note in his diary under April 8, 1854: "At Nut Meadow Brook I saw, or rather heard, a muskrat plunge into the brook before me, and saw him endeavoring in vain to bury himself in the sandy bottom. Looking like an amphibious animal, I stooped and, taking him by the tail, which projected, tossed him ashore."

That was a trick the sage of Walden seems to have been fond of, for we read that once he served a woodchuck in the same way.

In addition to the snug all-the-year-round home, the muskrat usually makes for himself a winter lodge and storehouse combined. The burrow can be found ordinarily only by searching for it, tracing the subaqueous flight of the owner by the line of bubbles that rise as he speeds towards his shelter, or by falling into it when the roof is thin as you stroll along the bank. But the winter lodges are conspicuous, dotting the frozen marshes like miniature haystacks, sometimes six feet high—a vast heap of doing for a small diameter of being, as Thoreau piously observed. They are composed of whatever grows or lies nearest—sticks, reeds, weeds, grass, etc.—and may be entangled among swamp brush or firmly set upon a foundation

carefully cleared of vegetation and loose mud. The interior is usually soft grass, but whether this is arranged as the building proceeds or is put into a chamber hollowed out from beneath after the mass has been heaped up I do not know.

The houses are of various shapes and sizes, and doubt is thrown upon the present sagacity (to say nothing of the alleged foreknowledge) of the architects, when it is known that a large proportion of them are so placed that the first regular late fall rise in the water is sufficient to drown the denizens out and sweep the whole structure away. At any rate, the evidence scarcely justifies measuring muskrat lodges as a means of forecasting winter. It is better to get instruction by observing their structure and uses, and amusement by contemplating them as interesting features of the landscape. "In the still sunny days," to quote again from one of Rowland Robinson's graceful New England essays, "between the nights of its unseen building, the blue spikes of the pickerel weed and the white trinities of the arrow-head yet bloom beside it. Then in the golden and scarlet brightness of autumn the departing wood-drake rests on the roof to preen his plumage, and later the dusky duck swims on its watery lawn.

Above it the wild geese harry the low, cold arch of the sky, the last fleet of sere leaves drifts past it in the bleak wind, and then ice and snow draw the veil for the long winter twilight over the musk-rat's home and haunts."

II

THE WAY OF A WEASEL

AS I was hurrying down the path past my neighbor's cabin at the edge of the rocky woods this morning, I heard a commotion in the brush, and an instant later saw, rushing across the road ahead of me, a pullet, closely followed by a weasel, the latter going very easily as compared with the chicken's frantic haste. My neighbor happened to be standing by his doorstep, and, running forward to meet the pair, he stamped his foot upon the weasel just an instant after it had leaped upon the poor hen,

whose feathers were already flying like thistle-down.

Reaching down, my neighbor lifted the weasel by the nape of the neck between his thumb and forefinger, and held him out for us to view—an image of impotent rage.

His head was like a round wedge, his ears lay flat back, his round, black eyes glowed like jet beads, and the long-whiskered white lips, flecked with blood, were drawn back from a jagged row of needle-pointed, ivory-white teeth, in a snarl that portrayed a bandit captured but not conquered. He writhed and squirmed in the man's firm grasp, trying his best to get his teeth into the detaining fingers, and did succeed in scratching them with a pair of canines already smeared with blood from the wounded pullet.

It would be hard to draw a finer picture of baffled fury than that little creature exhibited. He knew he was doomed, for he remembered other chickens he had caught and killed; and had he acted like a coward he would simply have been drowned in the horse-trough or had his brains dashed out against a rock. But his bold spirit against overwhelming odds—his unquenchable courage—won him a better fate, for, calling his dog, my friend

gave his captive a chance for a hero's victory or death in honorable battle.

The little weasel, not one-twentieth the weight of the big terrier, accepted the challenge without a glance of appeal or hesitation. The instant he was thrown down before the dog he faced his foe, with fur on end and feet braced and jaws wide open—never a thought of running away in his plucky little head.

The terrier rushed in, only to have the weasel leap straight at his open mouth and fasten its teeth in his nose. This was disconcerting, and the dog squealed with surprise and pain; he, also, was courageous, and, shaking off his tormentor, seized it again, only to have it wriggle a second time out of his jaws and make a valiant effort to escape. The dog darted after it and got a new hold, but so did his undaunted and pertinacious foe, and Nip had now to whirl the weasel round and round his head before he could shake its grip loose and seize its limber body in an effective grasp. Even then, when, crushed at last, the weasel lay at the point of death among the bruised and bloody weeds, an indomitable spirit glared from the black eyes, the sharp teeth were bared as defiantly as ever, and he fell over on his side and died like a hero.

These weasels, whose coats turn pure white (except at the black tip of the tail) in winter in Northern countries, give us the ermine of the furriers, and are among the few wild quadrupeds that seem to maintain themselves against civilization, or even to profit by it. This they can do because of their small size, their clever wits, their fearlessness and hardihood.

Finding some cranny to their liking among the rocks, or within a stone wall, a weasel family will furnish it with bedding of dried grass and make a home as sung as it is secure. An exceedingly narrow door-way will serve them, for their loose and lithe bodies can creep through a very small and tortuous aperture, which can be defended against any enemy unable to tear the place to pieces.

A snake, indeed, is the only hostile thing (barring another weasel) that can get into such an intricate den. I believe a weasel would not hesitate an instant in attacking it if it came; and I guess he would overcome the worst snake of our woods. I have never seen a battle between a serpent and an ermine, but I have no doubt the mammal, small as he is, could avoid the reptile's fangs by his leaping agility — for he is acrobat and contor-

tionist in one — and destroy it by his lancet-like teeth.

It is characteristic of so courageous a creature that it should be a faithful ally. A pair will stand affectionately and nobly by each other in danger, and a weasel mother will defend her young to the last gasp. I once met in the spring, in the woods, a family of minks—only another sort of weasel —consisting of a mother and four little ones, perhaps a quarter grown. In the first surprise the mother darted under a rock, whining a danger-signal to her children, one of which I knocked on the head to add as an instructive specimen to my collection of skins; while the others, too young to understand their danger, dodged about among the leaves.

The instant I stooped to pick up the dead kitten the mother rushed at my hand, and I had to draw back quickly to escape her. She stopped at my feet and sat up on her haunches, her lips drawn back, her eyes gleaming, and every hair on end, whining and daring me to come on. I stood perfectly still, and in a minute she dropped down on all fours, and, always keeping her eye upon me— a giant to her apprehensive view—coolly began to collect her babies, and carry them off, one by

one, in her mouth, to a place of safety under a rock, where perhaps was their home. A lion could not have shown more clean courage and indifference to danger than that small mink mother.

A relative of mine, a preacher and truthful, relates that he was sitting in an upper room of his house at Easthampton, Massachusetts, one afternoon, when he saw a weasel come up the stairs, enter the room and saunter about, examining everything within reach of his nose, including the parson's square-toed boots, with careful attention. Having completed this survey, he quietly withdrew, pattered softly down-stairs, and the dominie went on with his sermon. Whether his visitor also went to hear the sermon I do not know; and it is a pity, for then, perhaps, we should learn whether it really were possible to "catch a weasel asleep."

Ferocity marks all that the weasel does. He constantly kills more than he can eat, seemingly just for the joy of seizing and killing, and a pair that make their residence near a poultry-yard will destroy the flock in a short time if not prevented. They are the terror of the wild birds—one of the worst of their daylight foes, especially for the ground-keeping birds; and here again they arouse

the anger of the sportsman, whose wild poultry, the quails and grouse and woodcock, they kill before he himself can get a chance to do so with his gun. I have known one recently to kill a half-grown house-cat.

Thus, between their coveting the value of his fur and their vexation at his depredations upon the farm-yard and the game-preserve, most men are at enmity with the weasel and compel him to be on his guard whenever he goes abroad. Yet so secretive and sly is he, so exceedingly alert, quick, and courageous, that he maintains himself in great numbers everywhere outside of towns. Civilization, indeed, has helped rather than hurt him and his tribe. His food does not consist altogether, or perhaps mainly, of birds, but, even if it did, he would be benefited by the human clearing and cultivation of the wilderness, because these bring about a multiplication of the total number of birds in a locality, in spite of the fact that a few species are lessened or extinguished.

But man's operations also tend to increase the total of small mammals, such as rabbits, gophers, squirrels, and mice, upon all of which the weasel preys with avidity, and none of which can wholly escape him, for he can race the swiftest of them

with success, can pursue the squirrels to the topmost tree-boughs, though he dare not follow them in lofty jumping, and can chase into their utmost burrows those creatures that seek safety in holes or by digging. Of mice he kills hundreds in the course of a year, no doubt, and thus repays the husbandman for the chickens and ducks he steals, and he will clear a barn of rats in a short time. It is believed that the household mouser of the Greeks in early classic days was a kind of weasel and not at all a cat. The chipmunk is a tidbit he is extremely fond of, and probably more of these pretty ground-squirrels fall beneath his teeth, especially in winter, when snoozing in their underground chambers, than lose their lives in any other single way.

Of what, indeed, is this bold little carnivore afraid?—for fear may honorably quicken the beating of a heart where cowardice finds no residence.

In the New England or Middle States almost nothing exists to alarm him, except man and his guns, dogs, and traps. Where wild-cats range the woods, he no doubt falls into their grasp now and then, and then sells his life as dearly as possible; and that he would "die game" even within

the jaws of a wolf one may be sure who has seen his sturdy, undaunted struggle with a dog. I have read and have seen pictured accounts of birds of prey having seized weasels of one kind or another that in turn fastened upon the bird's throat or body, and so were carried up into the air until they had gnawed the bird's life away, and both came tumbling to earth locked in mutual murder. It is quite possible something of this sort may occasionally happen, but I have never seen it, nor can I find any evidence of a predatory bird in this country ever having seized a weasel, even by mistake, for something easier to handle.

This animal's endowment of especial valor seems, therefore, superlative, and tending to needless slaughter and cruelty in nature. But this quality is probably an inheritance from the distant past, when the race of weasels dwelt in the midst of a world of fighting against conditions and enemies which they have survived by means of these very virtues; and it may be that here, as sometimes happens elsewhere, virtues have changed into vices through change of exterior circumstances.

But this leads us into what is really a wrong and illogical position, for what we are calling vices—namely, the weasel's acts of rapacity and

unnecessary slaughter—are only so from our point of view and in his relation to us.

Apart from the fact that the excessive slaughter of which he is "guilty" may have a beneficent purpose and effect in keeping down the too rapid multiplication of mice and other noxious pests whose other natural enemies have been unduly diminished in cultivated regions, it must be remembered that he is doing only what it is the business and need of his life to do; and that we hate him principally because he becomes a rival and interferes with our own plans in the same direction. Hence the vengeful spirit in which my farmer-friend that morning hurled him down before the dog was as illogical as it was unkind.

On the whole, philosophically considered, the difference between the weasel's acts and our own cannot be regarded as really great—to the victims!

III

BIRD TRAITS AND QUALITIES

NO one of all the classes of animals is more worthy of attention, or more easily studied, than birds. Including within their number every variety of costume and shape; present everywhere, and at all times; making us their confidants by coming to our door-steps, or awaiting us with newer and newer surprises if we go to the remote woods, the pathless ocean, or snowy mountain; marshalling their ranks over our heads, coming and going with the seasons, and defying our pursuit; surely, here is something for the poet

Cooper's Hawk

and artist, as well as the naturalist, to think upon.

But a bird is something more than a flitting fairy, or an incarnation of song. It has substance and form; it moves swiftly, mysteriously, from place to place, and looks out carefully for its own protection and subsistence; it cunningly builds a home, where it raises its young and teaches them to care for themselves. The how and why of some of these incidents of bird-life I want to tell you—I say some, for, after all, many of the ways of our familiar birds are unexplained.

The most prominent fact about a bird is a faculty in which it differs from every other creature except the bat and insects — its power of flying. For this purpose, the bird's arm ends in only one long, slender finger, instead of a full hand. To this are attached the quills and small feathers (coverts) on the upper side, which make up the wing. Observe how light all this is: in the first place, the bones are hollow; then the shafts of the feathers are hollow; and, finally, the feathers themselves are made of the most delicate filaments, interlocking and clinging to one another with little grasping hooks of microscopic fineness. Well, how does a bird fly? It seems simple enough to

describe, and yet it is a problem that the wisest in such matters have not yet worked out to everybody's satisfaction. This explanation, by the Duke of Argyle, appears to me among the best: An open wing forms a hollow on its underside like an inverted saucer; when the wing is forced down, the upward pressure of the air caught under this concavity lifts the bird up, much as you hoist yourself up between the parallel bars in a gymnasium. But he could never in this way get ahead, and the hardest question is still to be answered. Now, the front edge of the wing, formed of the bones and muscles of the fore-arm, is rigid and unyielding, while the hinder margin is merely the soft, flexible ends of the feathers; so, when the wing is forced down, the air under it, finding this margin yielding the easier, would rush out here, and, in so doing, would bend up the ends of the quills, pushing them forward out of the way, which, of course, would tend to shove the bird ahead. This process, quickly repeated, results in the phenomenon of flight.

The vigor and endurance that birds upon the wing display is astonishing. Nearly all the migratory species of Europe must cross the Mediterranean without resting. Many take the direct

course between Spain or Africa and England, which is still farther. Our little bluebird pays an annual visit to the Bermudas, six hundred miles from the continent, and Wilson estimated its apparently very moderate flight at much more than a mile a minute. Remarkable stories are told of the long flights tame falcons have been known to take—one going a thousand three hundred miles in a day. Yarrell mentions carrier-pigeons that flew from Rouen to Ghent, one hundred and fifty miles, in an hour and a half; and it is believed that a certain warbler must wing its way from Egypt to the Baltic, one thousand two hundred miles, in one night, and it is probable that martins endure equal exertion every long summer's day, in their ceaseless pursuit of insects. Taking, then, one hundred miles per hour as the rate of flight during migrations, we need not be surprised that representatives of more than thirty species of our woodbirds have been shot in the British Isles, since they could well sustain the sixteen hundred miles between Newfoundland and Ireland. Many species habitually cross much broader spaces of ocean.

"A good ornithologist," says White, of Selborne, "should be able to distinguish birds by their air, as well as their colors and shape, on the ground

as well as on the wing, and in the bush as well as in the hand." Almost every family of birds has its peculiarities of manner. Thus, the kites and buzzards glide round in circles with wings expanded and motionless; marsh-hawks or harriers fly low over meadows and stubble-fields, beating the ground regularly. Crows and jays lumber along as though it were hard work; and herons are still more clumsy, having their long necks and longer legs to encumber them. The woodpecker's progress is in a series of long undulations, opening and closing the wings at every stroke. Our thistle-loving goldfinch also flies this way, but the most of the *Fringillidae* (finches, sparrows, etc.) have a short, jerking flight, accompanied with many bobbings and flirtings. Warblers and fly-catchers fly high up, smoothly and swiftly. Swallows and night-hawks seem to be mowing the air with cimeter wings, and move with surprising energy. On the ground, most small birds are hoppers, like the sparrows, but a few, like the dove and water-thrush, truly and gracefully walk, and the "shore-birds" are emphatically runners. Among all sorts, queer movements are assumed in the love season, not noticeable at other times.

There is no part of the world where the feathered tribe is not represented; but no two quarters of the globe, and scarcely any two places a hundred miles apart, have precisely the same sort of birds, or in similar abundance. There are several reasons for this: first, the influence of climate. Birds provided with the means of resisting the extreme cold of northern regions would be very uncomfortable under a southern sun. The geographical distribution of plants has long been recognized, but it is only recently that a like distribution of birds has been proved to exist. Moreover, oceans and high mountain chains limit the range of many kinds. Europe and America have scarcely any species in common, save of water-birds and large hawks. Those from the Pacific coast are essentially different from those found in the Mississippi Valley. Each district has a set of birds—and other animals as well—peculiar to its peculiar geography. Another great circumstance, determining the presence or absence of certain birds in the breeding season, is the abundance or scarcity of suitable food, not only for themselves, but also for their young; as the food of birds at that time is often very different from their ordinary diet, it requires a close acquaintance with

them to prophesy confidently what birds would be likely to be found breeding at a given point.

But few birds remain in the same region all the year round. Out of about two hundred and seventy-five species occurring in New England or New York in June, only twenty-five or so stay throughout the year; of these, forty or fifty come to us in winter only, leaving us two hundred and twenty-five species of spring birds, half of which number merely pass through to their Northern breeding-places. With this disparity, no wonder that we look for the return of the birds, and hail with delight the bluebird calling to us through clear March mornings, the velvet-coated robins, the battalions of soldierly cedar-birds, the ghostly turtle-doves sighing their surging refrain, the pewees, and thrushes, and golden orioles, till at last, amid the bursting foliage and quickness of May life, a full host of brilliant choristers holds jubilee in the sunny tree-tops.

In a very few days, as suddenly and mysteriously as they came, half the gay company has passed us, going farther north to breed. Could we follow this army, we should find it thinning gradually, as one species after another found its appropriate station—a part in upper New England and Canada,

many about Hudson Bay; while not a few (water-birds especially) would lead us to the very shores of Arctic fjords. For them the summer is so short that ice and snow start them south before we have any thought of cold weather. On their way they pick up all the Labrador and Canada birds, reinforced by their young, so that an even greater army invades our woods amid the splendor of October than made them ring in the exuberance of June. Then our own birds catch the infection, and singly, or in squads, companies, and regiments, join the great march to the savannas of the Gulf States, the table-lands of Central America, and on even to the jungles of the Orinoco. What a wonderful perception is that which teaches them to migrate; tells them just the day to set out, the proper course to take, and keeps them true to it over ocean and prairie, and monotonous forests, and often in the night! That the young, learning the route from the parents, remember it, is a general proposition attested by the fact that they are at the tail of the procession both ways, for, in proceeding northward, the old males go ahead of the females a week or so, and when returning in the fall, the males again take the lead and the young bring up the rear.

All birds migrate more or less—even such, like the crow and song-sparrow, as stay with us through the year; for we probably do not see the same individuals both winter and summer. Even tropical birds move a little way from the equator, and back again with the season; and in mountainous regions most of the birds, and many small quadrupeds, have a vertical migration only, descending to the valleys in winter, and reascending to the summits in summer—difference of altitude accomplishing the same climatic results as a change in latitude.

We can see various causes of these migrations, some of which have already been suggested, but one potent cause seems to be the necessity for an accustomed food. We find that those birds which make the longest and most complete migrations are insect and honey eaters; while the graminivorous and omnivorous birds, and such, like the titmouse and nuthatch, as subsist on the young of insects to be found about the bark of trees, go but a short distance to escape inclement weather, or do not migrate at all. Sportsmen recognize the fact that the snipe and woodcock have returned, not because the rigorous winter days are wholly passed, but because the frost is sufficiently out

of the ground to allow the worms to come to the surface; and know that in warm, springy meadows these birds may often be found all through the year. Man, no doubt, influences the migratory habits of birds. To many he offers inducements in the shelter, and in the abundance of insects which his industry occasions, to linger later in the fall than was their wont, and return earlier in the spring. While, on the contrary, the persecution which the shy wild-fowl have received has caused them generally to repair to secluded breeding-places, far north of their haunts of fifty years ago. But the migrations of most birds are somewhat irregular, and we have so few reliable data that we can hardly yet determine the laws which govern their seasonal movements, much less assert the ancient origin of the "migratory instinct," so called, or state the varied influences that have led to the present powerful habit, and have pointed out the routes which the flocks now follow, spring and fall. The geologist must aid the zoological student in solving these problems.

The true home of a bird, then, is where it rears its young, even though it be not there more than a third of the year, and everywhere else it is merely a traveller or migrant. Should you then, after,

say, two years of observation, want to write down a list of the birds inhabiting your district—and you would thus be doing a real service to science—it is important that you mention whether each bird breeds there, passes through spring and autumn, or is only a winter visitor.

Perhaps there is no animal in the world that comes nearer to man's heart and seems more akin than the bird, because of its beautiful home-life and the loving care with which it anticipates and provides for its brood. There is a charm about the nest of a bird that does not linger about the hive of the wild bees, the burrow of the woodchuck, or the dome of the muskrat. It is more a *home* than any of them. The situation varies as much as the birds themselves. Trees, however, form the most common support; among the tip-top branches of them warblers fix their tiny cradles; to the outer drooping twigs of them orioles and vireos can swing their hammocks; upon their stout horizontal limbs the thrushes and tanagers may come and build; against the trunk, and in the great forks, hawks and crows and jays will pile their rude structures; and in the cracks and crannies, titmice, nuthatches, and woodpeckers clean out old holes, or chisel new,

in which to deposit their eggs. But most of the large birds of prey inhabit lone crags, making an eyrie which they repair from year to year for the new brood. The ground, too, bears the less pretentious houses of sparrows and larks, and the scattered eggs of sand-pipers, gulls, and terns; the marshes are occupied by rails, herons, and ducks; the banks of rivers are burrowed into by kingfishers and sand-martins; so that almost every conceivable position is adopted by some bird or another, and its peculiar custom usually, though not by any means invariably, adhered to by that species. A curious instance of change in this respect is shown by the two barn-swallows and the chimney-swallow, which, before the civilization of this country, plastered their nests in caves, and in the inside of hollow trees, as indeed they yet do in the far Northwest. In the materials used, and the construction of the nest, birds adapt themselves largely to circumstances. In the Northern States, for example, the Baltimore oriole uses hempen fibres, cotton twine, etc., for its nest; but in the heat of Louisiana the same pouch-shaped structure is woven of Spanish moss, and is light and cool. The intelligence and foresight that some birds exhibit in their architecture prove reason

rather than instinct, as we popularly use these words; while others are so stupid as to upset all our respect for their faculties of calculation. Both sexes usually help in building the nest, and work industriously at it till it is ready for the eggs—sometimes finishing it even after the female has begun to sit.

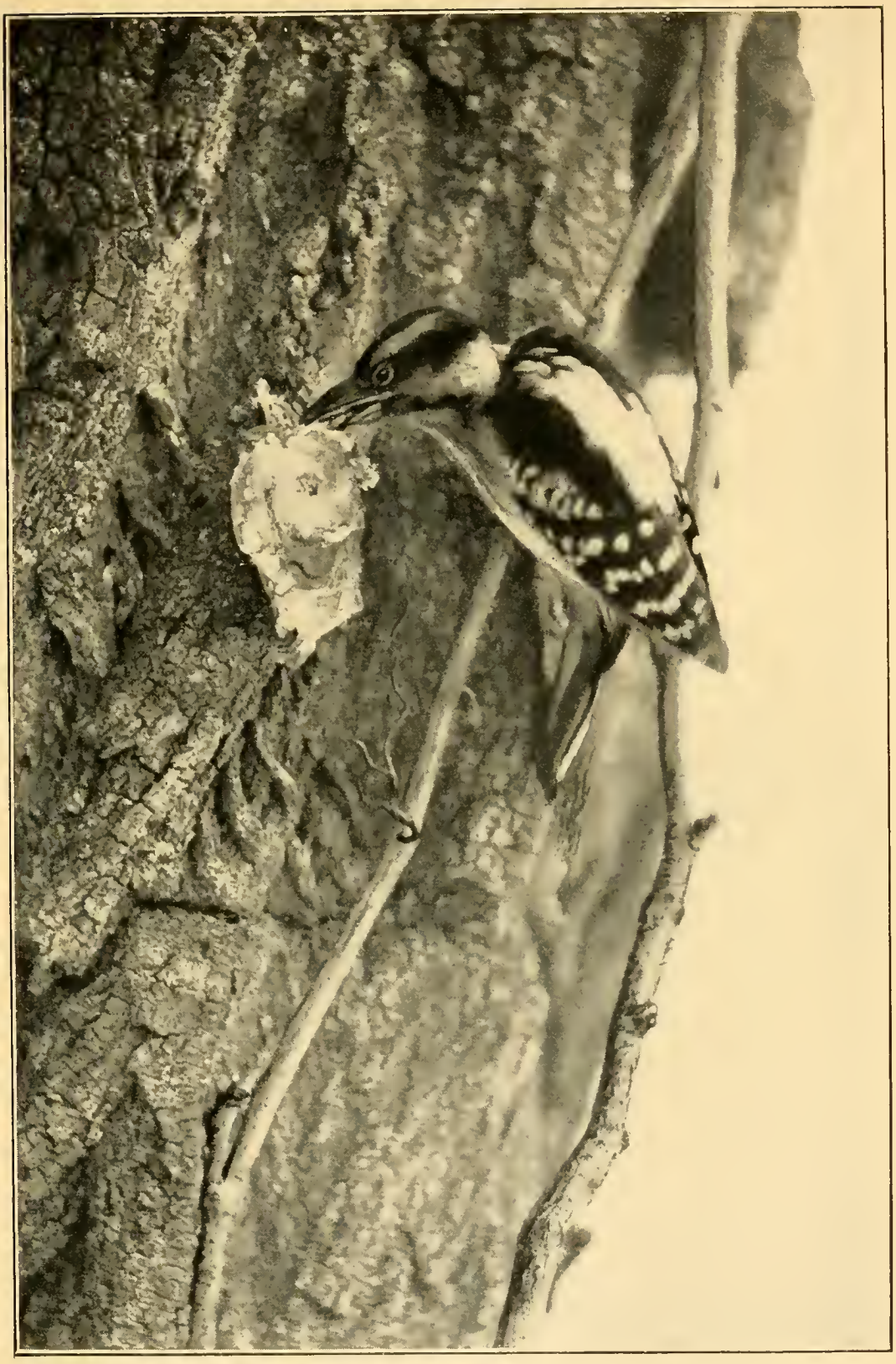
The best-known birds probably are such famous songsters as the nightingale and the skylark; and because these and our canaries are foreign, most persons suppose that we have no equally fine songsters of our own. Let a doubter go into the June woods only once! June is harvest-month for the ornithologist. Then the birds are dressed in their best, are showing off all their good points to their lady-loves, are building their nests, and—being very happy—are in full song. Morning and evening there is such a chorus as makes the jubilant air fairly quiver with melody, while all day you catch the *yeap* of pygmies in the tree-tops, the chattering and twittering of garrulous sparrows and swallows, and the tintinnabulation of wood-thrushes. I cannot even name all these glorious singers. Perhaps the many-tongued mocking-bird stands at the head of the list; possibly the hermit-thrush, whose song is of "serene re-

ligious beatitude," or the blue grosbeak or winter wren. As you choose. The bird you think pre-eminent to-day will be excelled to-morrow, and you will refuse to distinguish between them for the love and admiration you bear them all.

IV

OUR WINTER BIRDS

NOT often in the genial days of early and late summer, or even in the torrid heat of its middle months, do we recall winter with pleasure, or wish ourselves surrounded by its scenes; while, on the contrary, the dark hours of the long winter evenings are often enlivened with reminiscences of balmy weather, the fireplace is adorned with bouquets of dried flowers, and every indication of returning spring is eagerly welcomed. Nothing is more precious to the eye, weary of the desolation which snow and ice bring to the land-



Downy Woodpecker

scape, than the winter birds, whose bright forms alone diversify the bare and colorless world, and whose cheery notes alone break the stillness and apparent immobility of Nature. They always carry a bit of the June sunshine about with them, and, dropping it from their wings, like seed, wherever they flit, seem thus to preserve the season through the ravages of winter, to which all else succumbs. Some words about them may, therefore, help to keep the sense of summer alive in our hearts through this midnight of the year.

Most persons are surprised when told of the large number of these feathered friends which begin the new year with us; for in January, in the near neighborhood of New York city, over fifty species appear with more or less regularity. They comprise two classes: those which reside in our fields the year round, like the bluejay; and such, like the snow-flake, as are driven to our milder climate by the severity of a Northern winter that even their arctic-bred, hardy constitutions are unable to endure. The members of the latter class visit us in varying numbers, but are especially numerous in snowy seasons.

It is probably less a fear of the dreadful temperature, even in the frigid zones, which compels

the birds to seek our milder latitudes, than the inability to obtain food when snow buries the seed-bearing weeds and sends the smaller animals to their *hibernacula,* and the increasing darkness of the long arctic night shuts out from view what the snow has not covered. All birds—or almost all—on their southward migration, fly at night, resting during the day. We have the most abundant evidence of this; and it has occurred to me that possibly it is the deepening darkness of high latitudes which first warns them off; that the natural recurrence of night seems to them like being overtaken by the darkness which they thought they had left behind, but which they must again flee; that, therefore, they keep upon the wing until each morning's light, supposing that they have thus again and again outstripped the pursuing gloom, until they reach a region of abundant food, and perhaps learn wisdom from its resident birds. I will confess, however, that this theory is more fanciful than philosophical.

Whatever the motive, no sooner has the crowd of autumnal migrants, with rustling wings and faint voices, swept through our woods—slowly during the long, mellow October days, when the earth seems to stand still and the seasons to be in

equipoise; swiftly when the first blast of November sends them skurrying onward with the deadened leaves—than their places are taken by the brave little fellows whose fame I celebrate.

Taking my way to the woods some bright, still morning in January, when the snow is crisp and the ice in the swamps firm, I shall find the sombre fields full of a life of their own well worth my while to see, even if the exhilaration of the walk does not prove reward enough. Here on this fence-rail is the track of a squirrel, and in the corner of the rail and rider is the half-eaten body of a chickadee which some butcher-bird has hung up. How the dry wood creaks as I climb over, and how resonant is that dead ash under the vigorous hammer of the little woodpecker whose red crest glows like a spark of fire against the white limb! Around this spice-bush the mice have been at work, nibbling the bark off up to the surface of the snow, and I can see the entrance to their tunnel. This path, trod bare by the cows, leads to the hilly brush-pasture where the southern sun shines all the afternoon, and thither let me follow.

Sunny hill-sides, the wooded banks of creeks, the hedgerows and brier-grown fences along the country roads, are all favorite places for the winter

birds. Here come the sparrows and finches, the winter wren and rare cardinal, skulking about the thickets, hopping through the dead fern-brakes, threading the mazy passages of the log-heaps and brush-piles ready to be burned in the spring, coming out upon the fence-post or way-side trees to sing their morning roundelay and take their daily airing in pleasant weather. In the open meadows are the grass-finches, snow-birds, and the few robins and medlarks that stay with us; in the edge of the woods the bluejay, flicker, and butcher-bird; in the orchards and evergreens the crossbills, the pine grossbeaks, red-polls, and cedar-bird; the deep woods shelter the tiny nut-hatches, titmice, and the little woodpeckers; the open sky affords space for the birds of prey, and the sea-shore harbors for the gulls, sea-ducks, and fish-hawk. Such are the chosen resorts of the different varieties, yet, of course, we shall occasionally meet all everywhere, and sometimes spots apparently most favorable will be totally uninhabited. In very severe weather the wildest birds are often compelled to come close to the house and barn in search of out-door relief from gentle hands.

"How do the birds manage at night and in

tempestuous weather?" is a question often asked me.

The time is not long passed when it was universally believed that many of them hibernated — especially the swallows — burying themselves in the mud like frogs, or curling up in holes in rocks like the bats; and the common phenomenon of the appearance of a few summer birds during "warm spells" in winter was assumed to prove that they had been torpid, but had waked up under the genial warmth, as bats often do. It was not many years ago that I saw in an English newspaper a letter from a man who claimed to have found a hedge-sparrow (I think) torpid somewhere in the mud. But the search for proofs of this theory discovered that the birds supposed to hibernate migrated, while, of the birds which remained in this latitude through the cold months, we saw more in warm, fine weather, for the natural reason that then they forsook the sheltered hollows and cosey recesses of the woods where they had retreated during stormy days, and came out into the sunlight.

Dense cedars and the close-set branches of small spruces and other evergreens afford them good shelter, and thickets of brambles are made

use of when these are not to be found; hollow trees are natural houses in which large numbers huddle, and the cave-like holes under the roots of trees growing on steep banks become favorite hospices. The grouse plunges through the snow down to the ground, where it scrapes a "form," or crawls under the hemlock and spruce boughs that droop to the earth with the weight of snow, and allows the white mantle to drift over it, subsisting the while on the spruce-buds; when the storm ceases it can easily dig its way out, but sometimes a rain and hard frost follow, which make such a crust on the snow that it cannot break up through, and so it starves to death. The more domestic sparrows, robins, and flickers burrow into the haymow, find a warm roost in the barn near the cattle, or, attracted by the warmth of the furnace, creep under the eaves or into a chink next the chimney of the greenhouse or country dwelling. The meadow-lark and quail seek out sunny nooks in the fields and crouch down out of the blast; while the woodcock hides among the moss and ferns of damp woods where only the very severest cold can chain the springs. Along the coast many birds go from the interior to the sea-shore in search of a milder climate.

Nevertheless, in spite of all these resources in the way of shelter; in spite of their high degree of warmth and vitality, probably not exceeded by any other animal; in spite of the fact that they can draw themselves up into a perfect ball of feathers which are the best of clothing, and that they can shelter themselves from the driving storm, it appears that birds often perish from cold in large numbers. Ordinarily, birds seem able to foretell a change of weather, and prepare. The reports of the United States Weather Bureau show that — certainly during the fall and winter, and apparently generally—the ducks, geese, cranes, crows, and other notable species abandon their former haunts upon the approach of a cold wave or hard winter storm for more southern localities, often passing beyond the reach of the severity of such storms, though taking their departure only a few hours before the unfavorable change begins. Resident species, not caring, or not able, to run away to warmer latitudes, ought to know enough to hide away from the fury of the gale; and they do. But sometimes there come sudden, unpresaged changes—cold, icy tempests, that charge down upon us after thawing-days, converting the air, which was almost persuading the grass to revive,

into an atmosphere that cuts the skin like the impinging of innumerable particles of frost, and shrivels every object with cold or buries it under dry and drifting snow. Then it is that the small birds, caught unprepared, suffer. At first, such as are overcome seem unusually active, running about apparently in search of food, but taking little notice of one's approach. "Should one attempt to fly," writes a recent observer, "it immediately falls on its back as if shot. The legs and toes are stretched out to their farthest extent, and are quite rigid; the eyes protrude, are insensible to the touch, and the whole body quivers slightly. It remains in this state from one to two minutes, when it recovers suddenly, and seems as active as before. If taken in the hand, it will immediately go into convulsions, even if it has been in a warm room for several hours and has been supplied plentifully with food. Death usually puts an end to its suffering in a day or two."

Such catastrophes are more likely to occur, however, in the spring, after the birds have begun to come northward, than in the steadier weather of January; and even the song-sparrows and snow-birds, which have successfully withstood the rigors of the lowest midwinter temperature, as often

succumb as the less inured songsters from the South.

The favorite among our winter birds, perhaps because the most domestic, taking the place of England's robin-red-breast, is the slate-colored snow-bird, which is one of the finches. It comes to us with the first frosts, and stays until the wake-robin and spring-beauty bloom. Even then some of them do not go far away to spend the summer, for they breed in the heights behind the Delaware Water Gap, and also in the Catskills. The main body, nevertheless, go to Canada and Labrador. In the Rocky Mountains I have seen them many times in midsummer as far south as the latitude of Cincinnati; but there the Canada jay also breeds, although in the East its nest is never found—great altitude in the West affording the same climate which eastward is only to be attained at high latitudes.

The nest of the snow-bird is placed on the ground among the moss, or under the protection of the root of a tree, and is built of grass, weed stalks, and various fibres. The eggs are whitish, sprinkled with pale chocolate and dark reddish-brown. Several species besides our *Junco hyemalis* are found in the mountainous parts of the West and

Northwest, but they intergrade confusingly, and their nidification is essentially the same. A snow-bird is a snow-bird from one end of the country to the other, and the sharp, metallic note is characteristic of the whole genus.

Truer spirits of the driving snow—for the junco is a sort of fair-weather bird, after all—are the snow-buntings, or snow-flakes, or white snow-birds, or, absurdest of all, winter-geese, as the Nahant fishermen call them. Their systematic name is *Plectrophanes nivalis,* and their plumage is handsomely marked with white and chocolate-brown. Sometimes a flock of these buntings will whirl into our door-yard for a brief moment; but in general you must go to the upland fields and frozen marshes to find them, and the best time is just after a "cold snap" or a heavy snow. The Hackensack meadows are sometimes full of them, and I have seen flocks of hundreds pirouetting over the ice-covered, wind-swept shores of Lake Erie, or whirling down the bleak sands of Cape Cod. What attracted them to such exposed and dreary spots I could never divine. When they first come they seem unsuspicious of any special danger from man, yet are continually skurrying away from some imaginary cause of alarm. Never

going far south of New York, we see few of them even here in mild seasons, and, as the close of the winter approaches, they are among the first to hasten to their home within the arctic circle. In every alternate flock of snow-flakes may perhaps be found one or two Lapland longspurs—another bird which builds its nest in the moss at the foot of Greenland glaciers. Its coat is white and black and chestnut, so that it is easily distinguishable from its lighter fellow, but it is very uncommon.

Next to the diminutive humming-bird, the smallest bird on this continent is the golden-crested kinglet, on whose tiny brow rests a coronet of gold, fiery red and black, below which the jewelled eye is set in a soft, dusky background of olive-green. From tooth to tail he is not so long as your finger, yet this pygmy braves the fury and desolation of winter as cheerily as though soft skies arched overhead. I owe him many thanks for piping his nonchalant, contented little lecture into my ears when I have growled at the weather and the "foolishness" which dragged me out-of-doors on certain terrible days, only to see what such absurd fellows as he were about. He is the most independent, irrepressible little chap I know of, and for the life of me I never can be

downhearted when he is by. In summer the gold-crest (like his royal brother, the ruby-crown) is a fly-catcher, expertly seizing insects on the wing; and on warm days in winter he forages in the tree-tops for such moths and beetles as are abroad; but necessarily he must subsist chiefly on the larvæ which hibernate under the rotten bark, and upon insects' eggs. Thus he is helped to many a meal by the sapsuckers and tomtits, whose stronger bills tear open the recesses where the larvæ lie. In summer the kinglets retreat to boreal regions to rear their young; but we know very little about their domestic life. Just before they leave us in the spring I may, perhaps, have the rare treat to hear a long way off the resonant song of this minute minstrel—bold and clear, carrying me away aloft like that of the English skylark.

Another personification of

"Contented wi' little, and canty wi' mair,"

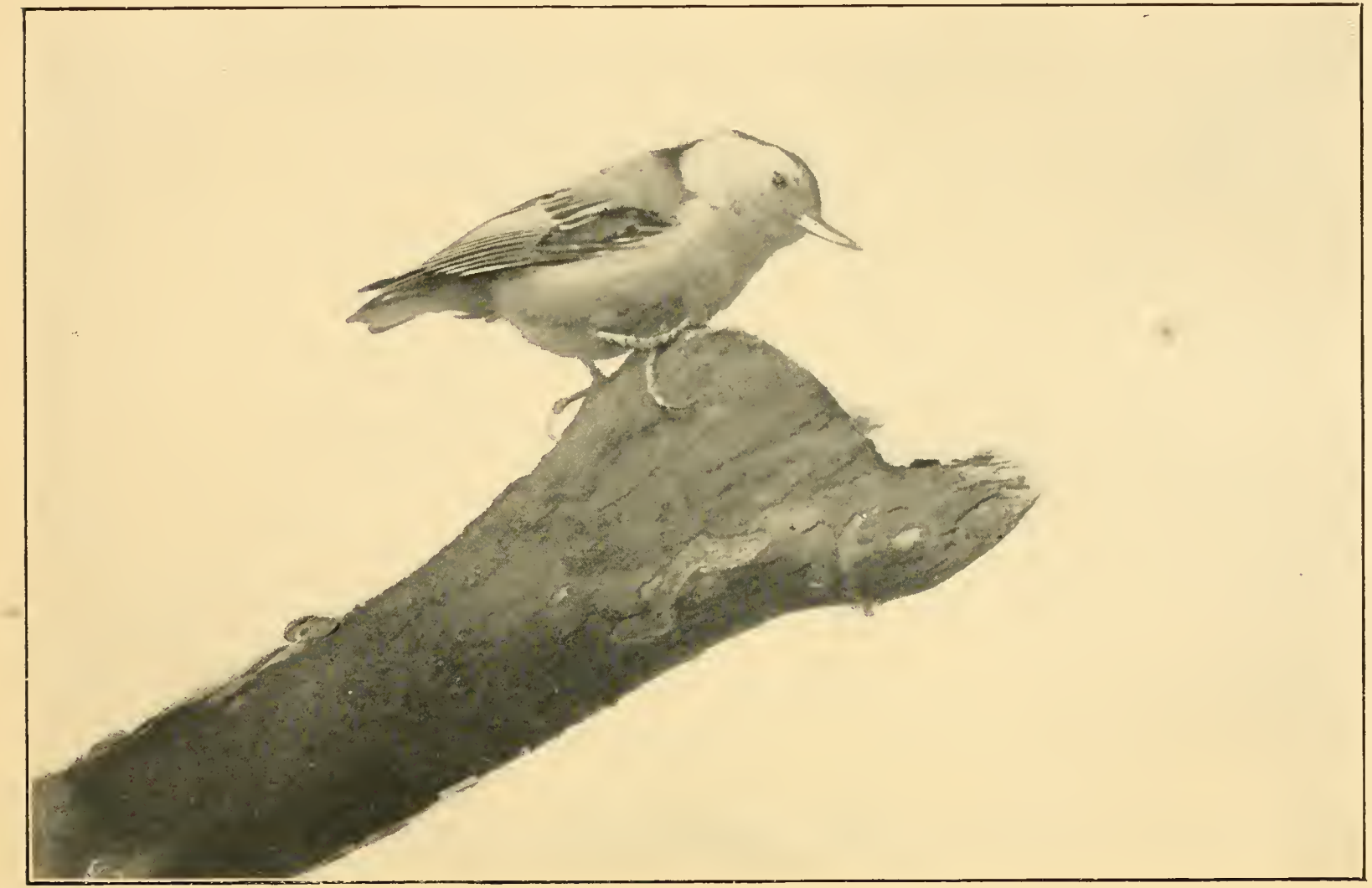
is the brown creeper, whose bill is curved and long and tender, so that he can do very little digging for himself, but follows in the track of the woodpeckers and nuthatches, and picks up the grubs which their vigorous beaks have dislodged, or

searches carefully for such small insects and their eggs as are not well concealed. There is one now in the tree next my window, in the edge of the city, as I write. He flew from the neighboring horse-chestnut to the foot of the ailantus, and began a spiral march upward. I see him creep steadily round and round and round the trunk, with his tail pressed in against the tree to sustain him (like the pointed stick trailing behind a Pennsylvania wagon), peering into every crevice, poking his bill into all the knot-holes and scars where limbs have been shivered off, running out on each branch, here picking up half a dozen eggs that only a bird's sharp eye could find, there transfixing with his pointed tongue some dormant beetle laid away on his bark shelf, or tearing open the pupa-case of some unlucky young moth, snugly dreaming of a successful *début* in May. This creeper is always to be found in our winter woods and orchards, yet is nowhere abundant; its life is a solitary one, and, although not shy, it is so restlessly active as easily to elude the eye. If, in the early spring, you have the rare fortune to hear its song, regard the privilege as precious.

Another creeping bird, almost always moving head downward, more often seen in midwinter,

because then he approaches civilized life, while in summer he retires to the remote woods to rear his brood, is the familiar nuthatch, whose peculiar *nee-nee-nee* — the most indifferent, don't-care-a-bit utterance in the world—is heard from every other tree-trunk. Like the brown creeper, the nuthatches seek their food on the boles of trees, examining every part by a spiral survey—a sort of triangulation—and are not content till the top is reached, when they dive straight to the roots of the next tree, and begin a new exploration. There is no time wasted by these little engineers in foolish flying about or profitless research. Not allowing a cranny to go untouched, they drag out every unhappy grub it shelters before raiding the next hiding-place of insect life. Their feet are broad and strong for clinging; their bills are small pick-axes, their tongues harpoons, and their brains marine clocks, just as steady one side up as another.

Thus they are able to search out the injurious borers and the like which pass through their metamorphoses beneath the bark; and, except when everything is incased in ice, do not eat seed, or even alight on the ground. They are among the most active and serviceable of the fruit-grower's benefactors, continuing, during the cold months,



White-breasted Nuthatch

the good work dropped in October by the summer birds, and finding in his insidious enemies their favorite food. The nuthatch is the leader of that admirable little company composed of the chickadee, the crested titmouse, the downy woodpecker, and sometimes of the red-bellied nuthatch and *spirituel* creeper, which Wilson truthfully describes as "proceeding regularly from tree to tree through the woods like a corps of pioneers; while, in a calm day, the rattling of their bills, and the rapid motions of their bodies, thrown like so many tumblers and rope-dancers into numberless positions, together with the peculiar chatter of each, are altogether very amusing, conveying the idea of hungry diligence, bustle, and activity."

Every one knows the black-capped titmouse —our jolly little chickadee, and his jolly little chant:

> "*Chick-chickadeedee!* Saucy note,
> Out of sound heart and merry throat,
> As if it said: 'Good-day, good sir!
> Fine afternoon, old passenger!
> Happy to meet you in these places,
> Where January brings few faces.'"

He is the hero of the woods; there are courage and good-nature enough in that compact little body,

which you may hide in your fist, to supply a whole groveful of May songsters. He has the Spartan virtue of an eagle, the cheerfulness of a thrush, the nimbleness of Cock Sparrow, the endurance of the sea-birds condensed into his tiny frame, and there have been added a pertness and ingenuity all his own. His curiosity is immense, and his audacity equal to it; I have even had one alight upon the barrel of the gun over my shoulder as I sat quietly under his tree. The chickadees appear to come to us with the first frost, and keen eyes may discover them all the year round in the quieter orchards or woodlands, whither they retire to nest in some old woodpecker's hole.

There is a winter wren also, but, although considerably smaller, it is frequently mistaken for the inquisitive and saucy house-wren, which fled south in October. It is a species heard rather than seen, evading observation in the dense brush through which it moves more like a mouse than bird. Its prolonged and startling bugle-song is a wonder, and its whole history is charming, but I must pass it by. If you wish to become acquainted with it (and several of its midwinter associates) in more genial days, you have only to go to the

depths of the Catskills or Adirondacks, where it spends its summer.

The family of sparrows, finches, and buntings—the *Fringillidae* — supplies more of the winter woodland birds than any other single group, the list of those regularly present in January including the pine-grossbeak, the red and the white-winged crossbills, the two red-poll linnets, the pine, grass, and gold finches, the song, tree, and English sparrows, besides an occasional straggler like the purple finch, cardinal, and white-throat. The first six mentioned are polar bred, and return to their native heaths at the earliest intimation of spring. The pine-grossbeak is a big, clumsy looking bird, with a plumage reminding you of a blossoming clover-field—a mixture of red and dull green. It has found out what its thick, strong bill was made for, and crushes the scales of the tough pine-cones as though they were paper. The pine-grossbeaks often come into the village streets, hopping about in search of almost anything to eat, and are very tame and interesting. Their note is a cheery one, and when captured they thrive well in the cage, eat apple-seeds greedily, and become very entertaining. The pine-finch, or siskin, is its miniature, and seeks much the same

sort of food, but must get it from softer cones, for its bill does not seem half as stout. It is erratic in its visits, and its actions outside of the pine-trees are precisely like those of its cousin, the yellow-bird.

All winter you may notice along the field-fences and in the grassy plats beside the railway, where weeds have gone to seed, active flocks of small, plainly attired little birds, as cheerful as can be. These are our thistle-loving goldfinches, or yellow-birds, whose simple, sweet song and billowy flight were part of the delight of last summer, but which now have exchanged their gay livery of canary-yellow and black for sober undress suits of Quaker drab. The goldfinches, as such, appear with the apple-blossoms, and are seen no later than the gathering of the fruit; but their seeming disappearance in autumn, and reappearance in spring, are only changes of plumage. Nevertheless, they are not so abundant in winter as in summer, many moving a little distance southward. The cross-bills are naturally so named, for the tips of their mandibles slide by one another instead of shutting squarely together. Whether or not this peculiarity has been gradually acquired to meet the necessity of a peculiar instrument to twist open the cones

and other tough pericarps, upon the contents of which they feed; or whether it is an accident perpetuated and made the best of; or whether the crossed bill was "created" in that fashion in the beginning, with a definite intention towards pine-cones, we may theorize upon to suit our tastes; but certain it is that it answers the bird's purpose most admirably. The red crossbill is the more common of the two, but the white-winged is not greatly different. They fly in small flocks, often coming among the gardens, where their odd appearance never fails to attract attention. In addition to pine-seeds, they feed on the seeds and buds of the cedar, birch, alder, mountain-ash, Virginia creeper, etc., and probably add apples, haws, and berries to their bill of fare, as does the grossbeak. They are wonderfully happy creatures, fluttering in and out of the evergreens, or passing swiftly from one to another, working away at a swinging cone "teeth and toe-nail," heads or tails up—it doesn't matter—till every kernel is extracted, then with one quick impulse launching into the air and departing—perhaps for the arctic circle—before you have had time to bid them goodbye. Both are irregular in their coming and numbers.

One of the earliest and handsomest migrants from the frozen North is the little red-poll linnet, which is about the size of a stout canary. He is a dandy, changing his gay suit of black, brown, white, saffron, pink, red, and crimson several times a year, and—at least until he is three or four years old—never dressing twice alike. He is an exceedingly melodious if not a very versatile singer; in England is often kept in cages and mated with the canary, and might be here. There would be no difficulty in catching him.

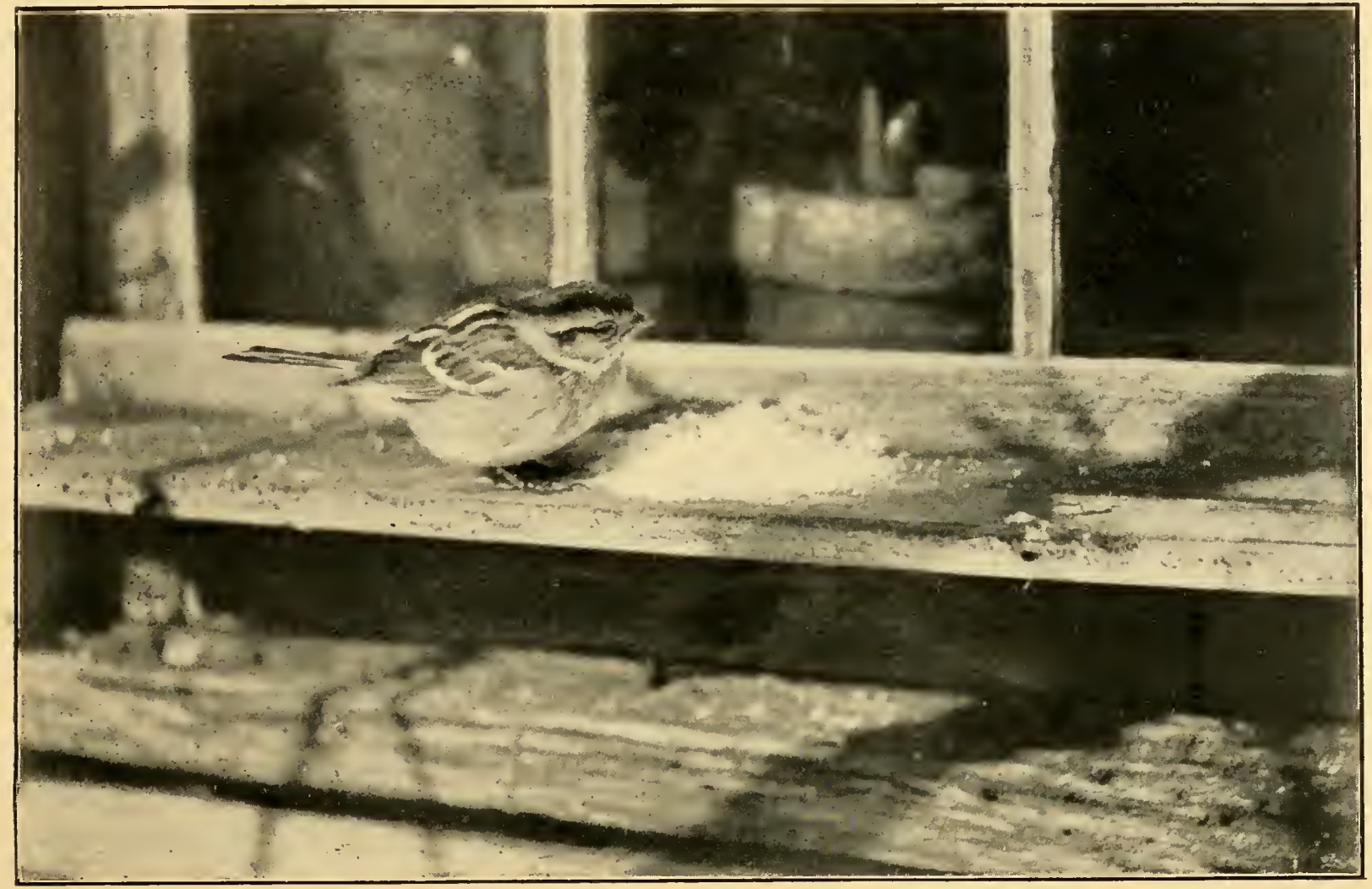
Two other of the familiar friends who make our spring meadows vocal with an incessant concert, the song-sparrow and grass-finch, remain with us through the winter also; but more than half the song-sparrows are frightened southward by the first snow-storm. A few, however, are always to be met with in the swamps and edges of the woods during January, living under cover of the briers and brush-heaps, and upon the seeds of various grasses and herbs, scratching up the leaves to get at dormant insects or their eggs, here picking up a checker-berry which the snow has not drifted over, there nibbling at the dried remains of blackberries, raspberries, and wrinkled crab-apples, squeezing the gum from a swelling

bud, tearing open the seed-case of the wild-rose whose blossom they shook to pieces as they darted to their nests in early June. The brown grass-finch—easily recognized by the two white feathers shown in the tail when flying—seems scarcely ever to leave the field in which it was born. It is emphatically a bird of the meadows, where its song is heard loudest in the long summer twilights when most other birds are silent, so that Wilson Flagg called it the vesper sparrow. Building its nest in a little hollow on the ground, finding its food among the grass, it seems hardly to fly over the boundary fence from one year's end to another. How these finches are able to stand the winter in the open fields is a mystery; perhaps they go elsewhere at night, or crawl into holes; but you may meet them scudding across the uplands every month of the year, keeping company with the few meadow-larks that remain.

All this month, in hedge-rows, wooded hollows, and thickets, beside springs of water, where very likely you may flush a woodcock, will be heard the low warble of the tree-sparrows, Northern cousins of the trilling chippy of our lilac-bushes, and of the pretty field-sparrow that from every green pasture calls out, *C-r-e-e-p, c-r-e-e-p, c-r-e-e-p,*

catch'm, catch'm, catch'm ! as my mother used to phrase it for me. They receive the name from the habit of taking to the trees when disturbed, instead of diving into the bushes and skulking away as do the other sparrows; but the less common name, Canada sparrow, is better. Once in a while they come into the towns; but the English sparrows soon get news of their presence and drive them away in true buccaneering style. These same outrageous English sparrows are the most conspicuous, really, of all our January birds, and now practise a real semi-annual migration back and forth between city and country like so many tramps.

Some birds besides those already noticed are residents with us the year round: thus a few robins, bluebirds, crows, bluejays, cedar-birds, kingfishers, flickers, blackbirds, purple finches, wild pigeons, quails, grouse, and woodcocks are always likely to be found in the neighborhood of New York in January; while one or two of the arctic woodpeckers, the Canada jay, the waxwing, and some other rarities, may be met with at long intervals. Of the birds of prey, we have in greater or less numbers this month the golden and bald eagles (about the Palisades), an occasional osprey, the



Hospitality to a Canada Sparrow

rough-legged, red-shouldered, and red-tailed buzzards, the marsh-harrier, and some others; and, among owls, the fierce snowy owl, which will take a grouse from its roost or carry off a hare; the barred, great horned-owl, long-eared, short-eared, mottled, and little saw-whet owls. Along the adjacent shores of Long Island and New Jersey are seen the various sea-ducks, "coots," and geese; the loon, and an occasional Northern sand-piper, like the splendid purple one; the herring, kittiwake, laughing, black-backed, and several other gulls; and irregularly certain wandering sea-birds whose lives are not so much affected by climatic conditions as are those of the land-birds.

Deprived of the small reptiles, the young of squirrels and other mammals, eggs, and the large night-flying moths and beetles which in summer form a good portion of their subsistence, the predaceous birds become more fierce in winter than at any other time, and exercise all their cunning in the pursuit of such meadow-mice and other animals as are imprudent enough to step out of their subnivean galleries, or in the capture of weaker birds. The few late fish-hawks remain by the sea-shore, plunging in now and then for their finny prey, which the bald eagle very often

compels them to relinquish to him. The golden eagle, covering the landscape with keen and comprehensive glance as he sweeps over in vast circuits, swoops upon hares, foxes, and the like, sometimes even picking up an early lamb, or catching a grouse before it can baffle its dreaded pursuer by burying itself in the snow. The buzzard and marsh-hawk sail low over the meadows in slow and easy flight, or stand motionless above some elevated spot in the lowlands, watching intently until a mole or shrew or mouse shows itself below, when they drop upon it like a shot, and carry it off before the poor victim has time to recover from its palsy of terror. Less frequently do these species seem to catch birds, and between Christmas and Easter they lead a very precarious existence. The owls, too, must "live by their wits," but, being nocturnal, they have the advantage of the birds, and, we may be sure, snatch many a tender one rudely from its roost in the open trees, although the dense twigs and sharp needles of the cedars and other close-boughed evergreens must offer such obstacles to the rapid passage of the owl as to allow many an intended victim to escape. The larger species, as the farmer well knows, will often in continued cold weather come into the very barn-

yard and carry off his chickens; while the nocturnal habits of most of the smaller mammals not hibernating in January lead them abroad when the owls are mostly flying, and on moonlight nights these prowlers get many a good meal, no doubt.

It would seem, therefore, as if the chances of death presented to the lesser winter birds by scarcity of food, rigor of climate, hawks by day and owls by night, outnumbered the chances of life offered by their alertness and enduring vitality. But there are some additional circumstances favorable to their escape from the latter fate, their resources against starvation and freezing having already been explained. One of these circumstances is the vigilance of the birds: they never are forgetful. Sometimes their curiosity leads them into danger, or an enemy like man, which they do not suspect, may approach them by being very quiet; but a hawk could never insinuate himself into a sparrow's good graces, nor could an owl win his confidence; both must trust to surprising him or overtaking him in an open race, which is about as difficult as "catching a weasel asleep." Then the hiding-places of the birds in hollow trees, crannies in walls, dense thickets, and brush-piles, during the night and in bad weather, are such as afford

excellent security from their nocturnal winged enemies, although quite accessible to foxes and weasels. It is a curious fact that fourteen or fifteen of our January birds choose hollows in trees or holes in the ground for nesting-places, as though consciously profiting by their experience of the security afforded.

Another very important circumstance favoring the preservation of small birds at this season is the fact that in the majority of cases the tints of their plumages are precisely such as best harmonize with the surroundings in which they are most often seen, and thus make them less discernible than they otherwise might be. Looking through our list of winter birds, many striking examples of this protective coloration are found—more, in proportion, than in summer, when there does not seem to be so great need of individual safety, and the "struggle for existence" is not narrowed down to such a strait and beset with so many difficulties. The kinglets, for instance, spend their time in flitting about the tops of the trees, and their plumage is found to be a dusky green, like an old leaf, while the fiery crowns which both wear are concealed, except at moments (of love-passion, I imagine) when they wish to display

them. Easier to detect than the kinglets, yet plainly dressed, are the titmice and nuthatches; but these frequent widely different scenes, and, moreover, have compensating advantages beyond most other birds in the habit of living mostly in the deep woods where diurnal birds of prey are uncommon, and at night of secreting themselves in small holes where the owls cannot get at them. This is also true of the small spotted woodpeckers, which, nevertheless, are very inconspicuous objects upon the dead and white trunks they frequent.

The brown and white streaks of the creeper (*Certhia americana*), however, seem to me to furnish a decided case of protective colors in plumage, since they harmonize so exactly with the rough, cracked bark along which the creeper glides that the wee bird is hardly to be followed by the eye at a moderate distance. Again, no coat would better help the wren to scout unobserved about the tangled thickets and through the piles of wind-drifted leaves in and out of this and that shadowy crevice than the plain brown one he wears; while the lighter tints of the goldfinch's livery are precisely those which agree with the russet weeds and grass whose harvest he diligently gathers. The group of exclusively boreal birds seems especially pro-

tected from harm by the correspondence of their coat and their surroundings. Their home is among the evergreens, where an occasional dead branch or withered stem relieves the verdancy with yellowish patches, and the thick-hanging cones dot the tree with spots of reddish-brown; their plumage is mottled with green, tints of yellow and brown, an inconspicuous red, and a little black and white—just the colors one's eye takes in at a glance as he looks at a hemlock. The practical result for our eyes (or a falcon's) is, that the pine-grossbeaks and finches, the crossbills and purple finches, blend with the foliage and cones and dead branches until they are lost to any but the most attentive gaze. The snow-bunting rejoices in a cloak of white, and thus mingles inextricably to the eye with the feathery flakes he whirls among, while his companion, the longspur, is almost equally ghostly. All the winter sparrows are of the brown color of the sere grass, withered leaves, and broken branches among which they dwell, except the slaty snow-bird, and he is of a neutral tint, easily lost to view in a shadow.

This protection of adaptive colors is not enjoyed to any great extent by the robin, bluebird, meadow-lark, cardinal-grossbeak, and kingfisher—but none

of these are "winter" birds here, properly speaking, but only loiterers behind the summer host, and ought really to be excluded from the comparison; nor by the crow, crow-blackbird, bluejay, Canada jay, and butcher-bird—but these are all large and strong, able for the most part to defend themselves; while, on the contrary, the colors of the large but timid and defenceless woodcock, quail, and grouse are highly protective.

Birds of prey themselves scarcely need such protection from one another, yet some of them regularly exchange their summer plumage for a winter dress of lighter and (in the general white of the landscape) less conspicuous tints; but this may operate to their advantage in the reverse way of allowing them to attain a closer, because unobserved, approach to their quarry. This leaves us, among the land-birds, only the bright redpoll and the waxwing as exceptions to the supposed rule that the plumages of winter birds are colored in a way directly favorable to their special preservation at that season of augmented danger.

But against one persecutor no concealment of natural color or artful device avails, and the brains of the pretty songsters, so full of wit to avoid other enemies and provide for each day's need, are his

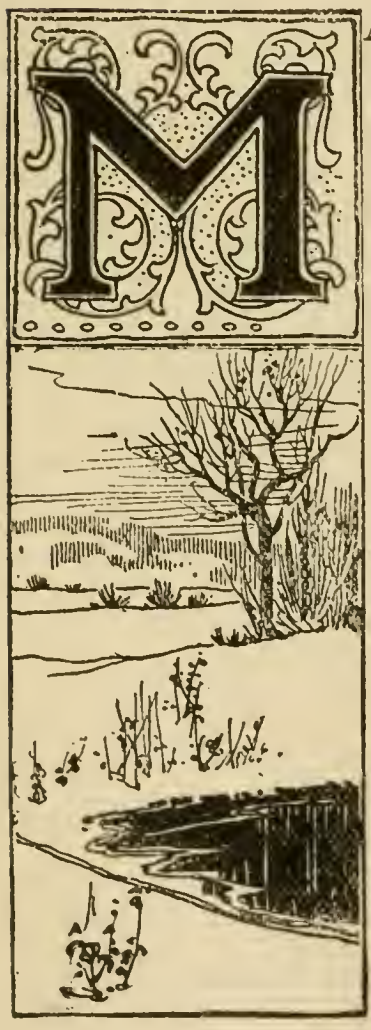
choice repast. This dainty tyrant wears an overcoat of bluish ash trimmed with black and white, a vest of white marked with fine, wavy, transverse lines, white knee-breeches, and black stockings. His eyes are dark and piercing; his nose Napoleonic; his forehead high and white; his mustache as heavy and black as that of any cavalier in Spain. This Mephistopheles among birds is a ruffian, truly, yet with polish and a courage without bravado which commend him. Being an outlaw in the avine kingdom, he can only maintain himself by adroitness and force, but has such singular impetuosity, prudence, and fortitude that he is not only able to keep himself and his retainers in health and wealth and happiness, but to gratify his bloodthirsty love of revenge by killing numberless innocents without mercy. Thus he has struck terror to the heart of every feathered inhabitant of the January woods. Like Cæsar, he knows and joyously endures hunger and cold and thirst. Is it biting, freezing weather, and blinding snow? Little cares he; he can then the more easily surprise his benumbed prey. Is it a warm, sap-starting, inviting day? He is at the festival of the birds—a fatal intruder into many a happy circle. His favorite perch is the

Young Shrikes

high rider of some lonely fence, where he quietly waits till a luckless field-mouse creeps out and he is able to pounce upon it; or an incautious sparrow or kinglet dashes past, unconscious of the watchful foe who seizes him like a flash of lightning. Having felled his quarry with a single blow, he returns to his fence-post and eats the brains—rarely more—or perhaps does not taste a single billful, but impales the body upon a thorn, or hangs it in an angle of the fence, as a butcher suspends his quarters of beef. It used to be thought this murderer thus impaled nine captives, and no more, so he was christened nine-killer; the bookmen labelled him *Lanius borealis;* we know him as the butcher-bird; he is the arctic brother of the summer shrikes, and the boldest and bravest of his savage race.

V

IN MARCH WEATHER



MARCH is not the most pleasant month in the year for a walk in the fields or woods, yet it is not wholly without attraction to the lover of rural scenes, and has the advantage of concentrating his attention upon a few things. There is now ordinarily neither the picturesqueness of the snowy winter landscape frozen into silence and immobility, nor the beauty and luxuriance of summer. Yet a sunny day offers much to the eye that is inspiring: it is worth while to examine how Nature spends her leisure.

The season is neutral-tinted.

The distant hills, the low meadows, the fallow ridges and bushy pastures are all dull purples and browns; a grove of mixed hardwood trees at a distance appears greenish-white below, dusky among the branches, and reddish at the top, where the sunshine is reflected from the new growth of twigs and sprouting buds; and the shadowy side of a group of evergreens forms a mass of black.

Under the trees the ground is carpeted with a layer of leather-covered old leaves and pine-needles, beaten flat by the flail of the rain and the pressure of snow; and where roily water has soaked into them we often see precise impressions in the mud, reminding us of, and explaining, the perfect casts of leaves common in some rocks, especially those of the coal-measures. The taller dead grass and reeds out in the meadow are less closely matted, and beneath their sheltering arches small animals have crept about all winter, finding plenty of seeds and small fruit, shaken to the ground for their provender.

Here and there through the wet fields go mysterious paths, without definite beginning or end, often so faint as hardly to be followed. When were they trodden? By what men or animals? Why were they deserted for the new, muddy ones,

where the last ice is now melting, and left to be reclaimed by patient Nature, who never becomes discouraged when men destroy her work, but persistently seizes the first opportunity to repair the damage done and restore the uniform wildness?

After a light snow in March these trails stand out with great distinctness and reveal themselves, where in summer they could hardly be traced. Now they offer the best footing, but lead nowhither. Whenever we step out of them we trip and stumble, our clothing is seized by innumerable detaining thorn-fingers, and the soil, left spongy by the frost, sinks elastic and oozy beneath our tread.

Poking aside the leaves and grass on this warm hill-side, where spherical swarms of minute flies are going through a mazy dance in the air, many herbs may be found already green and making ready to flower in the earliest spring, such as the hepatica, the cinquefoil, violet, and strawberry; but most of the leaves and runners of the last are varnished with rich burnt-brown tints as though japanned.

In the swollen but crystal-clear brooks, flowing at the foot of the slope among the weeds with a gentle, tinkling sound, the aquatic ranunculus and the water-cress are glowing with emerald foliage,

and we discover a few cylindrical cases of young caddis-flies anchored to the submerged stems of the plants. The mosses and little ferns on the bank are green, and where the meadows have been overflowed the alders are so full of embryo blossoms that their branches seem loaded with purple fruit.

Although the woods are so silent at this early season (whenever you are beyond hearing the frogs), echoing only occasionally the odd, jerky soliloquy of the scrambling little nuthatch, the cheery voice of the chickadee, and perhaps the boastful scream of a bluejay, there is a large aggregate of feathered life abroad in March, even before many migratory birds have come. Several of the birds of prey, and often the ravens and crows, are already breeding. The snowbirds and tree-sparrows linger in the pastures; the large, handsome, fox-colored sparrows appear; the cedar-birds whirl in and out of the red cedars and eat their purple berries greedily; a few song-sparrows dodge about the fence-rows, and little woodpeckers are hammering here and there wherever they can find a dead limb that may possibly conceal some undiscovered grub, or will, at any rate, reward them with a cheerful tattoo.

These, and the early migrants from the South, find an abundant harvest preserved for them in the meadows and wood-pastures, despite their desolate appearance; yet, considering the minuteness of the grass-seeds upon which they mainly feed, it is appalling to think what an enormous number of bites a bird must take to make out a dinner! But larger mouthfuls have been kept for them. The bayberry, or false myrtle, gleams with dense clusters of greenish-white berries; the close, sombre foliage of the juniper, or savin, is enlivened by innumerable purplish berries, upon which all the birds nearly gorge themselves sometimes; black alders, "glowing with the brightest scarlet fruit, and resembling at a distance pyramids of flame," are scattered about the lowlands, while on higher ground the stately mountain-ash repeats the scene, witches or no witches.

Sometimes, after a considerable interval of warm weather has melted away all traces of winter, and we fondly think its forces have been permanently beaten back, a heavy snow-storm will return, and then a new scene presents itself to the rambler. On the night before, perhaps, mock-moons have been hung in the glowering sky, and next morning the sunlight will struggle down, silver-gray,

through blustering winds and thickly flying snow. As, with bent head, I force my way into the fields, the air about me is full of light, and nearer objects are clear enough, but at a comparatively short distance little can be seen distinctly, although the white light seems continuous; and the receding town becomes more and more a beautiful, shining ghost of architecture—washed-in flat, as painters would say, with luminous tints gradually fading away to nothing, yet never losing transparency.

At first nothing is perceptible but the deafening gale and smothering snow, until presently I come to a ravine on the leeward side of a hill, where a grove of cedars is overgrown and tied together with squirrel-brier, while weeds and thorny bushes below are tangled into almost impenetrable thickets. Here is a hospice for the buffeted birds, and as soon as I step into its shelter, and catch my breath again, I begin to hear dozens of them, though not one is yet to be seen. Another plunge forward in the slippery drifts, and lo! a robin bursts out of a leafy covert at my elbow, scattering wingfuls of snow from the brittle old leaves, and springing a harsh alarm that instantly hushes the twittering gossip.

What a queer, pretty picture it is that greets

me as I turn my back to the rushing flakes, and so get my eyes open to look at it! Beyond a wide swale, that yesterday was gold and green but now is glistening wintry white, rises a small eminence where a dissolving view of trees and buildings is momently formed, then hidden, then brought out again, mirage-like, in the most curious and dream-like unreality, yet always with singular beauty. Gray is the only color—a soft, purplish, silvery gray—and the silhouette the only style of drawing. By their outlines I guess that that wavering, slender spike amid the glistening haze is the church steeple—that squarish blur the belfry of the court-house—the next irregular smudge a certain collection of house-roofs; but all seem as foreign and unsubstantial as shadows, so quaintly are they now clouded, now lightly revealed, by the swirling, satiny snow-flakes that fill the air with particles luminous in themselves yet obscuring the landscape.

Suddenly, dark midgets attract my attention, and, pulling my cap over my eyes, I wade out into the meadow where weeds and grasses stand thick above the snow. Tough and elastic are these thin old plant-stems that have kept their erectness all winter; and wild parsnips by the

Wet Snow in March

hundreds are holding up their hands with fingers clustered to catch fistfuls of this late cloud-bounty, as do children in the earliest autumn flurry, eager to welcome the coming of sliding and snow-balling.

Gleaning merrily among these weeds, whose capsules still hold a treasure of seeds, romps a company of sparrows, amicable and industrious. The largest and most conspicuous, of course, are the juncos, whose notes have so metallic a clink that once or twice I am deceived into thinking the distant hammering in a blacksmith's shop is their chatter in a new direction. Their slate-colored coats, buttoned high across the breast over white vests, like old-fashioned dress-suits, look positively black amid the purity of their surroundings, and they trot about nimbly on top of the snow, dragging their tails so as to leave a well-marked trail. With them are active, chippering field-sparrows, so small and colorless as to be hard to follow in the murk of the storm; a single olive-hued goldfinch, silent and unhappy; and—*phut!*—out from between my feet bursts a song-sparrow, scattering a fleecy spray like a torpedo. I stoop down and probe the hole. It is a well leading to a long tunnel beneath the bent grasses, and arched

by thick snow. Twenty birds could hide there, safe and warm; and at its farther end I find a half-made nest, soaked and sodden, yet well worth finishing, no doubt, after it has dried. This submersion must be a frequent mishap to this and other early birds, which catch something besides worms in our mutable climate; but had the owner gone so far as to have been sitting on eggs, doubtless she would have kept at her brooding and let the snow form a crystal canopy over her and her hopes.

I followed those plucky meadow-birds that day perhaps two hundred yards, wading through the snow and matted herbage, and I thought it fun. It gave a new view of everything; and the rascals paid so little attention to the bad weather that I would have been ashamed to shirk it. Then up the hill I went, through briers and brush and laden trees, fairly floundering in the snow, hearing but not seeing a crow whose querulous tone betrayed an almost despairing loneliness and disgust, and finally struggled across a bleak upland, where winter came and went at thirty miles an hour, to a road twisting down through a shady cutting to my copse.

Here was shelter, and the birds knew it. I saw

one fool of a robin (robins are mostly fools) hunched up, shivering and disconsolate, on an exposed twig where he could hardly keep his balance, as though he didn't care whether he lived or died; but all the others had stowed themselves away in snug crannies under the overhanging crest of the bank, or were wading in a little runlet at its foot, seeking food, or roosting comfortably beneath the thatch of dense cedar-bushes, and they scolded vigorously when I dislodged them in my attempt to learn where they were and what they were about.

Finches abounded, too, searching the bark of tree-trunks for hiding beetles or for insects' eggs, plucking at old flower-heads for seeds, nibbling the dried purple fruit of the brier, chirping and chatting cheerily, but never singing—except one sort, which kept high up in the tree-tops. It sang a bright, sweet, warbler-like lay, not often repeated, but breathing the spirit of sunshine and summer and green leaves in a way wonderfully inspiriting in this whirl of cold and snow. The delicate notes fairly sparkled as they eddied away with the flakes, and probably were those of the Canada sparrow.

During March the buds swell with sap and new energy; many forest trees begin to flower, to the delight of the kinglets and white-throated sparrows,

some even before they put forth their leaves; and patches of meadow and hill-side grow emerald-green with new grass, and are dotted with delicate blue and white and yellow flowers. The bluebird seeks its mate; the robin has already found one, and begun its nest; the song-sparrow is carolling to his love from every brush-pile; the swamp is vocal with the rollicking notes of the crow-blackbird and redwing, and marsh-hawks are again coursing low over the meadows in search of mice and the awakened frogs.

Such vernal rejoicing is often interrupted, nevertheless, by an ice-storm—one of the most disagreeable incidents of this month of many moods. A day of rain will come when the temperature is low enough to freeze most of the water as it falls, and the result is that the ground, the windward side of buildings, fences, tree-trunks, and all other exposed objects are soon perfectly glazed, and each leafless twig is incased in ice. When, as frequently happens, such a day and night are succeeded by a clear morning, and the bright but feeble sunlight is reflected from thousands of burnished, crackling twigs, as from a forest of glass, the scene is a very striking and beautiful one; but the weight of the accumulated ice often causes vast damage

to shade and orchard trees—one of Nature's rudest methods of pruning.

Such ice-storms occasionally happen as late as the last week of March, by which time all animal life has begun to stir about and many birds have arrived, so that widespread distress and death are likely to follow. The little birds can usually shelter themselves, though migrating hosts sometimes become so soaked and chilled in such storms that they are unable to fly, tumble helpless to the ground, and may be caught in the hands. The larger birds fare even worse. Credible instances have come to my knowledge of eagles and swans —the strongest of land and aquatic birds respectively—becoming so plumage-soaked and loaded with ice that they could not spread their wings or rise into the air, and have thus suffered the humiliation of being taken alive or knocked over with sticks.

I recall one such season when a tempest of freezing rain had raged for thirty-six hours, though it was quite time for winter's savagery to cease, even in stern New England.

Next morning it was hard times among the wild animals in the grove, and worse out in the country fields. Seeds and buds were locked in icy chests,

and the insect stores, packed away for safe-keeping under the bark and in various crannies, were sealed beyond the reach of the most persistent beaks. The field-mice found that their tunnels, bored just beneath the leaves while the snow covered them, were battered down; and the squirrels dared not venture along their slippery runways in the tree-tops, nor risk a leap from branch to branch.

The house at that time was surrounded with big trees, relics of ancient woods now almost engulfed in the growing town; these were inhabited by a large colony of gray squirrels, besides a few red ones. I could see, here and there, a head poked inquiringly out of a hole, or peering from the door of one of the little cabins lodged among the oak limbs; but not a single furry acrobat would trust himself to those glassy twigs, and I thought I could detect an anxious expression in their big, black eyes, as if they wondered how they were going to get any breakfast.

The squirrels had to endure their fast, but for the birds something might be done. So we cracked a handful of nuts, broke some corn into grains, and threw these and the table-crumbs out by the door. I had actually seen no birds about, save a band of bluejays and a group of English sparrows

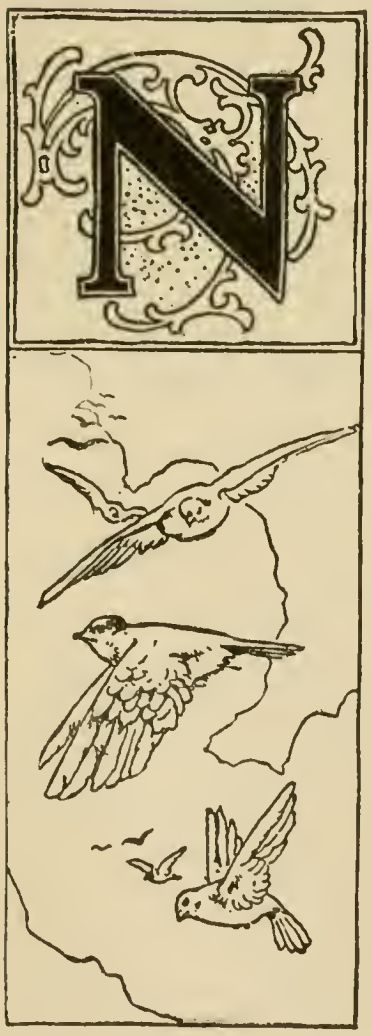
which had dwelt in the wood-pile all winter. But in a very few minutes a plentiful company came to our table, including some whose presence I had not noted before, evidently new-comers. There were song-sparrows with black ephods; the big-headed white-throats, and their brethren with the jaunty caps of black and white; the chestnut-crowned tree-sparrows; a goldfinch, still wearing his dull winter suit; a whole host of snow-birds, in white waistcoats with ivory bills and pink stockings; nuthatches, chickadees, and, most beautiful of all, the purple finch.

This last is one of our most confiding and pretty birds, looking as if he had plunged his crested head deep into the juice of dead-ripe strawberries, the rich syrup of which had trickled down his breast, staining rosily the white feathers, and had poured over his back into a pool near his tail.

How did all these little beggars learn so quickly that alms had been spread for them? Where had they been hiding? Whither did they disappear next day, when the sun had come out, the ice had melted, and not a bird visited my lunch-counter?

VI

BIRDS OF PASSAGE



NOTHING is more characteristic of our seasons, and nothing is more interesting in ornithology, than the migratory flights of the birds. We welcome them when they come North in the spring in tuneful companies as the most pleasing feature of a reviving world, this familiar acquaintance and that saluting us with well-remembered greetings. Many speedily disappear, to be sure, but most of them remain, to gladden our hearts and senses while we watch them cunningly contrive their homes and lovingly rear their young in our gar-

dens and groves. Then, in the restful, meditative days of autumn, the story is reversed. Birds of which we caught a glimpse in spring grant us a second brief interview, our summer friends are assembling and departing, and presently only the faithful few who reside with us the year around, plus some winter visitors from boreal parts, will be seen in our woods and meadows.

It appears, then, that we in temperate latitudes entertain two sets of annual visitors—one from the South and the other from the North. This is true, and it looks as though the custom of migration had begun among birds—wanderers by nature—by their annually leaving the overcrowded tropics for increasingly distant journeys, in the course of which they built their nests; and that after a while certain ones had got into the habit of staying in the new regions, or of making only short and partial migrations, which by-and-by will cease. It is significant that most of the pronounced migratory species are errant members of families mainly tropical.

We have in the middle parts of the United States four classes of birds, regarded from this point of view:

First—Those which do not migrate at all, and these are a goodly number.

Second—Winter visitors from the North, irregularly present south of the Great Lakes.

Third—Those whose migrations, although regular, rarely extend north of the Great Lakes in summer or south of the Gulf States and Rio Grande in winter, so that they are always present in some part of the United States.

Fourth—The true "birds of passage," hastily crossing our territory back and forth between tropic and subarctic regions, and rarely residing within our boundaries.

As a matter of fact, the extent of migration now varies from the longest possible distance to none at all, and from actuating a whole species to moving only a part of its individuals. In point of numbers, taking the whole world and all kinds of birds together, long-distance migrants are decidedly in the minority, and they belong almost wholly to the order of highest organization — the *Oscines*, or singing-birds.

Another remarkable circumstance is that members of the same family and even of the same genus differ very widely in this matter. We have finches that come and go from the South, and others that come and go from the North, and others that do not come or go at all. Some of our hawks and

owls are migratory, but others are not. Two or three of our sand-pipers breed all over the country, and the woodcock hardly leaves us, yet many of their near relatives hasten each spring from the equator to far beyond the arctic circle, and back again in the fall; some going on, indeed, to Patagonia, while their European congeners may nestle in Siberia and spend their off-months in Cape Colony. A few of our wood-warblers reside continuously in the Southern States, and several breed in the more northerly parts of the Union, yet other warblers winter only in the middle tropics and never breed south of Hudson Bay; and these are among the smallest and weakest of birds.

Here let me note, in passing, that very few species of birds—indeed, perhaps less than a dozen in the whole world—are known to breed in their winter homes, during their absence from our latitudes; and they are included in the few which travel clear past the tropics to the south temperate zone; and there are none, unless it be that world-wide wanderer, the golden plover and some of his cousins, which regularly migrate both north and south from the equator. The birds of the southern hemisphere are almost wholly different from those of the northern hemisphere, nor do they often meet

in the tropics, since when one set is staying there the other is absent, owing to the alteration of arctic and antarctic seasons.

How do we account for the existence of this habit, with its strange anomalies? No one has been able to do it satisfactorily thus far, and I do not mean to add any guessing, but, instead, to try to give some idea of the method of bird-migration; for, though we do not yet understand the *why*, we have learned a great deal as to the *how*.

I. THE SPRING MIGRATION NORTHWARD.

Observers in Central America and the West Indies, where most of our absent birds spend their winter, tell us that in March and early April they begin to find their voices and to gather in little bands which flit northward in an uncertain way until finally the movement grows steady.

Now, this is just the time when the tropical residents are mating and preparing to build their nests, so that whatever social force there may be in example is all towards influencing the restless emigrants to settle down where they are; but it has no such effect. This is also the time, since the rainy season is at hand, when vegetation springs into flower and fruit after the long drought, in-

sects' eggs are hatching juicy grubs, and these changing into perfect insects by the million. Bird-food is, therefore, unusually varied and abundant, so that no one can believe that fear of starvation forces the migrants into exile. Nevertheless, away they go, always arousing the country and beating up recruits, always choosing the easy route along the two sea-coasts, avoiding the mountainous interior, whose valleys send down reinforcements as the hosts pass, until they pour like a river from the Mexican lowlands into the United States—like two streams, in fact, for one goes up west of the mountains to people the Pacific coast of the continent. That east of the Cordillera is the more important, however, and as it enters Texas it spreads out and jogs into motion the large number of kinds that have been wintering there and in the Gulf States, until a mighty army in feathers is mustered and pressing North. A few follow the Rocky Mountains, and some march straight across the plains, but the great body gathers about the Lower Mississippi and press northward up the valley of that water-trunk to diverge later along its various branches and so overspread the interior.

A strong side-stream is deflected almost at the

start, however, which follows the Atlantic coast and the eastern foothills of the Alleghanies towards New York and New England. This last is augmented, perhaps doubled, by accessions that have come across the Caribbean Sea from South America to Florida, picking up West Indian recruits on the way; or perhaps, as many do, going north from the Antilles by way of the Bahamas and Bermuda, making nothing of the long water-jumps.

Along these real highways of bird-travel the migratory army moves steadily northward and eastward, as the opening season advances, the same sorts of bird always in the lead, and other sorts uniformly at the rear.

The arrival of each species at any given point is remarkably regular, varying only a day or two from the same date in average seasons; but the migrations as a whole are influenced by the weather, the birds coming earlier in a forward than in a backward season.

This means that they have met with less climatic obstructions to their advance. The water-fowl and marsh-birds, winging their way up the coast, cannot make headway against a Hatteras gale, but must seek shelter until it blows over; if such gales are long or frequent, they will be considerably

delayed, although, like a late train on a clear track, they can "make up time" very fast when the route is open. Similarly the inland birds may be halted by chilling northerly storms, which now and then descend upon us after the migration has begun, and check it completely. Searching the woods and fields, you will find bird-life storm-bound, and not a new feather greets you as long as the bad weather lasts. Then some evening the wind changes, blows balmy from a southerly direction, and next morning the sunny woods will be full of birds—a choir of music—where the day before were almost silence and solitude. These are the *avant courriers* of the host that has been waiting, and which has come on in the night, perhaps from a long distance and at high speed. All the kingbirds in the central Mississippi Valley were once known to make a rush forward of two hundred miles in a single night.

Such sudden accessions of migratory birds are called "waves," and they follow one another irregularly, coinciding with the alternating "waves" of cold-wet and warm-dry weather that compose our spring climate.

The actual travelling seems to be done mainly at night. Early risers by the sea will observe long lines

of ducks, and "wisps" of snipe and the like, coming in from the offing at dawn and settling down to rest and feed. They remain quiet during the day, but towards evening flocks are seen gathering and setting out anew to disappear in the dusk deepening over the waters. Similarly inland, the woodland and meadow birds show every sign of weariness and hunger as they drop into the fields and thickets at sunrise, and busy themselves in foraging. During the day our inland birds flit about, moving onward by short flights, perhaps, but without haste, loitering and feeding and playing as they go, until night comes, when you may see them rising into the air and moving with swift, steady strokes towards their goal. Hence a very dark and windy night impedes the advance of the migration more than a gloomy day; and warm, moon-lighted nights are followed by the greatest plenty of new arrivals; and hence, also, the birds are prone to follow the lines of valleys, because these afford not only more shelter for the diurnal resting, but a larger amount of wayside food than bleak mountain-tops or dry, open plains.

Professor Cooke has computed that the average advance in the spring is twenty-three miles a day; but this is never regularly maintained, the delays

caused by bad weather being made up by days (or nights) of far more rapid travel. The general sense of haste increases as the birds proceed. They not only have less bad weather, but loiter less in May than they did in March, and those species late in migrating always show more haste than the early comers. Especially is this true of birds that are bound for Hudson Bay or the arctic shores, and which towards the last must greatly increase their speed, since their arrival there is reported on dates little in advance of their appearance in our Central States, and quite as soon as the country is sufficiently free from ice and snow to permit them to obtain food. They feel that they need all the time the brief Northern summer affords, and must not be tardy; neither must they be too soon, or some backward blow from the retreating forces of winter may overwhelm them, as sometimes happens in spite of this caution. Their eagerness to advance into the extreme North, indeed, frequently leads them to brave storms and cold that are often fatal; while in the autumn the first frosts frighten them southward.

Even the smallest and shortest-winged birds are capable of extraordinary flights, impelled by their eagerness to reach home. Warblers, fly-catchers,

thrushes, and seed-eating birds, as well as water-fowl, annually pass from island to island of the West Indies, and visit Bermuda, Newfoundland, and other places far from the American mainland. This implies not only a power of continuous locomotion for hundreds of miles, but also a very swift pace, since a bird cannot take enough food into its stomach to supply its system for more than a few hours, on account of the celerity with which its highly active organization uses up nutriment. A bird is like a high-pressure engine with small furnaces, which must be constantly fed with fuel in order to keep up steam. The Mediterranean is not an obstacle to the semi-annual transfer of feathered population between Europe and Africa; Great Britain's quota crosses both the Channel and the North Sea; Japan and the Philippines are stocked from China or distant islands, while the remotest parts of the Pacific archipelago are visited by small, migratory land-birds as well as wandering sea-fowl, at the expense of traversing, sometimes, two thousand miles of open ocean.

What is possible over the sea may be easily undertaken above land, and some European ornithologists assert that certain small warblers habitually make their spring journey in a single night of un-

broken flight from the south side of the Mediterranean to the shores of the Baltic. These and many other facts go to show that if a warbler or sandpiper bound for the mouth of the Mackenzie or Boothia found itself late in reaching Manitoba or New Brunswick, it would be able to cover the remaining distance in a very few days and arrive "on time."

But these long-distance, persistent travellers, who are bidden by some strange, irresistible unrest to go to the very ends of the earth, are comparatively few, since most birds are able to satisfy themselves with a home well inside the temperate zone, and, fortunately for us, for the most part between the thirtieth and forty-fifth parallels of latitude, or, more exactly, within the isotherms which these lines represent in the central United States. They drop out of the march as they arrive, and contentedly set about establishing a home with an air of satisfied ease that we think shows gladness of heart.

Few are mated on their arrival. Family life has not been well preserved during their winter's leisure in the tropics, and it appears likely that the older males lead off when they start northward in the spring. At any rate, in nearly all cases

it is the old males that first come, and it may be a week or more before any females are seen, and still later before the young born the previous year appear. The explanation of this probably is, that the old birds, being stronger and more seriously bent upon the object of their journey, travel more rapidly than the females and youngsters. All are in their newest and gayest coats.

With one other pleasing feature I shall bring to a close this account of the first, or spring, half of the annual migration of our birds, and then be ready to say something of the second half, or their return southward in autumn; and this pleasing conclusion is found in the fact that year after year, and perhaps generation after generation, birds return to the identical neighborhood in which they and their forefathers have been bred.

There is abundant evidence of this in all parts of the world and for all kinds of birds, from the ocean fowl that punctually almost to a day have returned "since the time whereof the memory of man runneth not to the contrary" to the familiar sea-cliffs of Iceland or Alaska, to the wrens and robins of our door-yards that come back year after year to nestle in the same bushes. Who does not know of nests of the phœbe-bird, made every sea-

son since they were children under the same bridge —of certain holes where a wren's eggs may always be found—of elms that never fail to swing the cradle of an oriole?

This trait is not only a lovely one, but its existence, as a strong influence in bird-character, may throw some light on the vexed problem of how it happens that this wonderful custom of bird-migration originated and has become so fixed.

II. THE AUTUMNAL FLIGHT SOUTHWARD

The sole business of a migratory bird's sojourn in the summer-land of his choice seems to be the rearing of a family. This is his errand, and he gets as much fun by the way as he can. As soon as he reaches the right place—and he well knows where that is—he persuades some admired one to mate with him, and together they build a home and are diligent at domestic duties until the eggs hatch and the young are ready to leave the nest. This accomplished, the thoughts of the birds seem to turn immediately to the South—to the warm, fruitful, indolent, inviting latitudes where harsh winds and chilling rains and fading leaves never benumb bright spirits.

So strong is this longing that many of the older

males, with a neglect of parental duties otherwise inexcusable, often forsake their homes long before their offspring are able to accompany them, and begin to wend their way southward, loafing along by easy stages and enjoying life in bachelor companies as if no such a thing as responsibility existed.

This impulse does not seem to depend upon latitude or weather or the age of the young. Our own summer birds have largely left us long before mild weather ends, several species disappearing almost wholly from the Hudson Valley by the end of August, while their close relatives, or even brethren of the same species, are still lingering in the valley of the Yukon (where numbers begin their departure by descending to the warmer coast), and about Hudson Bay, until the first frosts remind them, in mid-September, that they must be off. Hence the arctic breeders are among the latest to pass by us in the fall, as they were among the earliest to go northward in the spring. These come at last with a rush, making our half-deserted woods populous again, at the end of September, with strangers hurrying south.

Snipe, sand-pipers, and plovers gather in chattering bands and dart away in the dusk to feed-

ing-grounds not yet threatened by frost; the woodland birds flit from willow-copse to birch-grove, and scud to the shelter of thick larches as they see following overhead the ominous forms of hawk and owl; the ducks and geese form into geometric angles and cleave their way through the air so swiftly that they can pause and rest almost indefinitely when some pleasant lake invites them to feast upon wild celery or rice, while slower travellers "catch up with them."

And as the migrants go on, tracing the Yukon, the Mackenzie, and other great rivers to their headlakes, skirting the coasts of Hudson Bay, and reviewing the sights of Labrador or Keewatin or the Canadian plains, they pass and leave behind them some hardy natives, like the ice-owl, the cross-bills, and the ptarmigans, who laugh at their haste; but they pick up and set a-going a constantly augmented multitude of birds who last spring stopped to make their nests in these less remote districts, until finally Canada has been swept clean of its summer birds and all are on the wing, southward bent.

Again, too, as in spring, it is noticeable that the old males are leading the host of each species, and that only later—sometimes much later—come

females and young. I am careful to make this matter of the succession of ages clear, because of its notable significance in the problem: How do birds find their way? The old answer was short and easy: Instinct tells them. This means, if it means anything, that a bird is born with an intuitive knowledge of a road he has never seen, perhaps crossing the ocean. In some instances it would mean an intuitive knowledge of *two* roads, for one of the curiosities of American migrations, at least, is the fact that certain species follow one route in the spring and another quite different one on their return in the autumn. Moreover, migration routes are rarely straight lines north and south, to which the little creatures might be kept by some mysterious "sense of polar direction," but are usually somewhat roundabout, often crooked, and sometimes squarely east and west for a large part of the course. Then we encounter such curiosities as the behavior of that warbler common in summer in Alaska, which never migrates along the American coast with the other birds, but crosses to Siberia and comes and goes to the tropics by the far longer Asiatic road. Another curiosity, which may be mentioned here as well as anywhere, is this: Where birds have been led, by the influence

of civilization or otherwise, to settle in unaccustomed districts, they take in their migrations, both ways, the roundabout course they pursued in their gradual spread of colonization. Thus all the bobolinks, lately become numerous in Colorado, go straight east to the Mississippi Valley and then southward, in the autumn, instead of striking straight south across Texas on their way to their winter home in Central America.

To call it "instinct" is only an attempt to disguise ignorance, but for a long time those who did so asserted that in this and that case the young of the year were the first to arrive from the North, and by doing so, and proceeding on their way without hesitation, showed intuitive knowledge. One by one, however, the alleged instances have been shown untrue; and it is safe to say that no species of migratory bird is now known whose young habitually precede their parents either in the spring or the fall. Even if they occasionally did so, other birds are thronging in the same direction, and the innocents need only "go with the crowd" until they met some of their own race. There is, then, no more mystery as to the young: they are guided by their elders, or else they are likely to get lost.

What does happen? This. The adult males

are first to respond and start off, because they are free of care; and they keep well in advance, because strong of wing. It is often ten days or a fortnight after these jolly old fellows appear before the bulk of the species they represent passes through our fields, and these are mainly females and young —family or neighborhood parties that have kept in company; and the last that are seen are almost invariably nestlings of the past season. There is, then, no mystery as to the young; they are guided by their elders or else they are lost.

But how do the elders find their way? A full answer to that question might take us back to the beginning of things, and then not be satisfactory; but we need not attempt so much. Let us say simply that they have been taught the route and remember it. If you care to believe that long inheritance has given them a special aptness towards geography, I shall not object; and this may amount almost to a faculty in some cases, as those of sea-crossing species. Such cases are not readily explained; nor is the ability of the human natives of the South African veldt or the American forests to strike a straight course to camp through an unmarked wilderness. Nevertheless, I do not believe that birds have any special or peculiar "sense

of direction" different from that possessed by other wild animals to a greater or less degree.

Every continent shows certain main routes or highways of bird-travel, which, when sketched upon a map, are seen to bear definite relations to the coast-lines, mountain ranges, and great river systems of the globe. In North America, Europe, and eastern Asia, where we know the subject best, these mainly lie in a north-southerly direction. Such bodies of water as the Mediterranean Sea or our Great Lakes are crossed without deviation, but lofty mountains are avoided as far as possible. This is strikingly exemplified by the highlands of southeastern Europe. Siberia and northern Russia get their summer birds by way either of the Volga or of the Rhone-Rhine and Baltic Valley, and the Danube forms a regular migration-route of certain European species that never cross the Alps to Italy and Africa, but go east to Persia and India for the winter. Our own birds do not regularly cross either the Rocky or Appalachian mountain ranges.

It is probably to get a wide outlook upon the landscape—spread it like a map beneath their glance—that birds fly at so great a height as they usually do during their migrations. The sight

of wedges of geese winging their way through the sky, so far away that they seem no larger than sparrows, is familiar, but lately we have come to know that the little birds also rise to great altitudes before undertaking their long flights. Persons observing the moon through powerful telescopes have recognized flocks of song-birds rushing across its face, and have estimated them to be from fifteen hundred to twenty-five hundred feet above the surface of the earth. In December, 1896, the meteorologists at Blue Hill, Massachusetts, while measuring the altitude of clouds by triangulation, made instrumental observations of flocks of ducks, and found them to be flying about one thousand feet above the valley, and at the rate of nearly forty-eight miles an hour. There seems no doubt that this altitude is often greatly exceeded, but even it would afford an immensely extensive outlook, and enable birds (which are remarkably far-sighted) to discover and recognize landmarks far in advance. This is nothing more than an extension of the familiar performance of homing-pigeons, which rise to about eighteen hundred feet, when liberated one hundred and twenty-five miles beyond any point familiar to them, before striking out homeward, while those set free (as has

been frequently done) over three hundred miles from any point they know, rise nearly out of sight in an effort to get their bearings.

I must confess, however, that this goes only part way towards solving the mystery of how birds find their way over vast spaces of shoreless ocean, as they habitually do in various parts of the world. A large number of our land as well as water birds have been recorded in western Europe, and a season rarely passes when some American songster is not heard of in Great Britain. These wanderers are evidently unfortunates that have been blown far off shore and then drifted before the wind until they struck the European coast; but the fact sheds light upon our problems by exhibiting the speed at which they must travel, since a bird's endurance of famine is very limited. That European birds almost never come to our shores is due to the fact that the prevailing summer winds blow towards the east.

Many regular migration routes, however, lead birds that follow them right across spaces of ocean nearly or quite as wide as the Atlantic. Shore-birds, such as plovers, sand-pipers, and curlews, fly straight from Nova Scotia and Newfoundland to the West Indies and South America; some will

halt at the Bermudas, and some go right by, passing with utter scorn of rest over the Antilles. These are all long-winged, strong fliers, and prominent among them is the golden plover, which is world-wide in its distribution, and apparently afraid of nothing. It breeds only in the marshy plains within the arctic circle, unless possibly, as Mr. W. H. Hudson suspects, there may be a breeding colony on the antarctic continent, to which, with certain other birds, it seems to resort every year by way of Cape Horn and the Falkland Islands. The great majority of those in Patagonia and Argentina, however, go all the way to Alaska and Greenland each year to lay their eggs. Similarly this plover returns annually from the Siberian tundras to India, Ceylon, the coasts of China and Malaya, and thence spreads over the East Indies to New Zealand. Still more remarkable, however, is its performance in the northern Pacific region, where every season it appears at the proper time in Hawaii, the Ladrones, Fiji, Samoa, and the other island groups of that vast ocean, none of which is less than two thousand miles from the nearest mainland and hardly less from each other. It is not surprising to learn that when they arrive at Hawaii in September the plovers are very poor

and weak, but those which stay there through the winter fatten rapidly, and in March or April begin to prepare for departure. "They can be seen during the day, at this time," says an authority, "taking long or short flights out at sea and returning again to the island. This exercise is undoubtedly for the purpose of strengthening themselves for the final effort — their muscles, during their winter's life of luxury and ease, having become flabby and feeble." This scene is repeated every spring in the North Island of New Zealand, when the curlews gather in flocks on the utmost headlands at sunset, and with plaintive gathering cries rise into the air, circling higher and higher until at last they turn and speed away across the twelve hundred miles of restless waves that separate them from the nearest resting-place.

But these feats of flight are by no means confined to sea-fowl. Land birds constantly travel between the mainland and such distant islands as Madagascar, the Canaries, and Bermuda—from the last-named even the ruby-throated humming-bird goes and comes with the changing seasons. In Oceanica migration-habits are observable that seem to have no part in the general equatorial-polar movement—the case, for instance, of

that local cuckoo which annually comes from the Fiji Islands to New Zealand to breed, and then returns to Fiji. These islands are fifteen hundred miles apart, north and south, with nothing between.

It is useless to pretend to explain how these birds know and are able to keep their course over these wide and windy spaces of ocean. We must wait until we get more information before offering even a guess at it. Possibly the investigations and experiments now being pursued by such a student as Professor Jacques Loeb, of the University of Chicago, may some day solve the problem, by the finding of some sort of "tropism" to which migrating birds conform.

Let us now go back to the more familiar and comprehensible ways of our own land birds.

The travelling at night seems an odd thing until we study it. Then it becomes evident that, otherwise, birds could have no time to get sufficient subsistence. Their food comes to most of them in so small particles, and their digestion of it is so rapid, that it requires almost incessant effort to supply their needs. That this is the secret of the night journeys is shown by the fact that such birds as swallows, swifts, night-hawks, certain birds of

prey, and others, that obtain their food on the wing, do not travel by night, but proceed wholly in the daytime, since they can forage as they fly. It is the birds that must hunt in the bushes for insects or fruit, must dig in old wood for grubs, or scratch the ground or probe in the mud or search the waters for their daily bread, that need daylight for this purpose more than for travelling. As evening approaches a careful observer at favorable points will see them gathering in little bands, or in great flocks, according to their habit, and then rising straight up to a considerable height before bearing away on their course.

In clear nights, and especially in moonlit ones, they fly high and far, reading the map of their route beneath them almost as well as by day, and we see or hear little of them. But when the nights are dark and misty, yet not stormy enough to prevent them attempting to get forward, the birds skim low over the tree-tops and houses, feeling their way from point to point, and often getting so confused that they quit altogether, and, dropping down anywhere, wait for a better time. Such nights come more often in the fall than in the spring, and no one who is abroad in a quiet, rural place on a warm, cloudy evening of Septem-

ber, can fail to hear in the gloom above him the almost incessant voices of passing birds, calling to one another, and doing their best to find the way and to keep together. It is at such times especially that birds are attracted by lights. The glow of illuminated towns allures them from afar, and the occupants of all tall buildings, such as nowadays rise like monuments in our cities, will tell you that night after night in the migrating season little birds knock at their upper windows and can hardly be driven away.

Nowhere, however, does this occur so plentifully as about lofty light-houses. On dark, quiet nights in the migrating season the great beams projected from these beacons will shine for hours together upon drifting, eddying hosts of birds of many sorts that flock about the lantern, rising and falling and fluttering like moths about a candle or huge snowflakes whirling in a wintry gale. All seem dazed by the glare as they rush into the powerful rays shot forth by the lenses; and many a one, blinded or crazed, dashes headlong against the lantern and falls stunned or dead upon the balcony or the rocks beneath. Hundreds of poor little victims to this infatuation for the brilliant light perish every year in and about the electric

torch of the statue of Liberty in New York Harbor and every other lofty light along the Northern coast.

So they drift by us, journeying leisurely southward through the bright autumnal days, following the turning of the leaves till they lose the richly colored carpet of the Northern earth in the green velvet of the tropical lands, or hurrying along over our sleeping heads through the gloom of night, always fleeing from the chill and desolation that follow hard after them.

Is the habit of migrating on the increase, or is it diminishing? Do birds tend to become more vagrant or more sedentary? I am inclined to the latter view. Many species, no doubt, have in modern times decidedly extended their range, owing to the opportunities afforded by spreading civilization, and in some cases this seems to have affected the migratory habit, enabling birds, perhaps by furnishing food or shelter, or both, to stay where formerly they were unwilling to remain from one season to another. This is likely to go on.

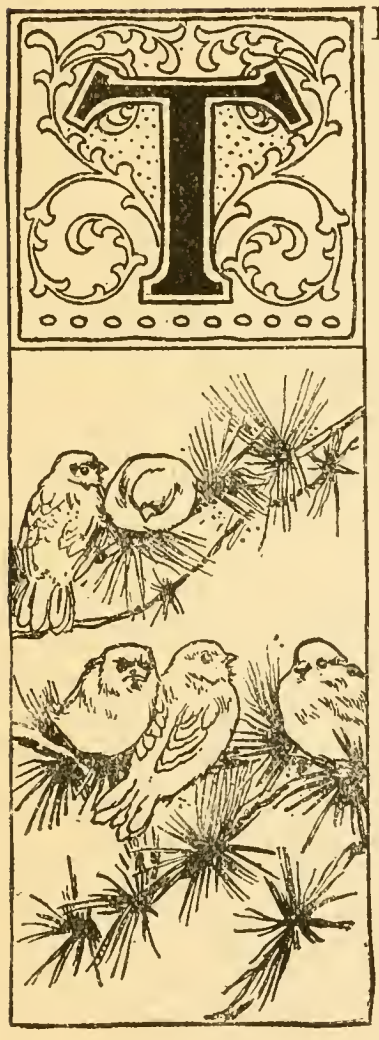
It would seem as though this ought to be the tendency, and that the migratory habit ought, after a time, to disappear, because it is, on the whole, a burden and hardship, handicapping its

followers in the struggle for existence. The exertion required, the time wasted, the perils encountered in these immense journeys, seem the reverse of economical, and a logical view of the matter seems to suggest that they should cease, and that all birds should gradually become capable of living all the year round in substantially the same place, as the greater part of them now do.

Such is the method of bird migration. You may speculate upon the origin and meaning of it to suit yourself, and have as good a chance as I, perhaps, of finding the true explanation; and if you do not arrive at a satisfactory answer to all its problems you will be likely, at any rate, to perceive much of the romance, poetry, and moral suggestion that it contains, and so be largely rewarded for your study. And if in failure you need consolation, remember that it was the Wisest of Men who remarked, that of the three things that baffled him one was *the way of an eagle in the air.*

VII

FIRST-COMERS

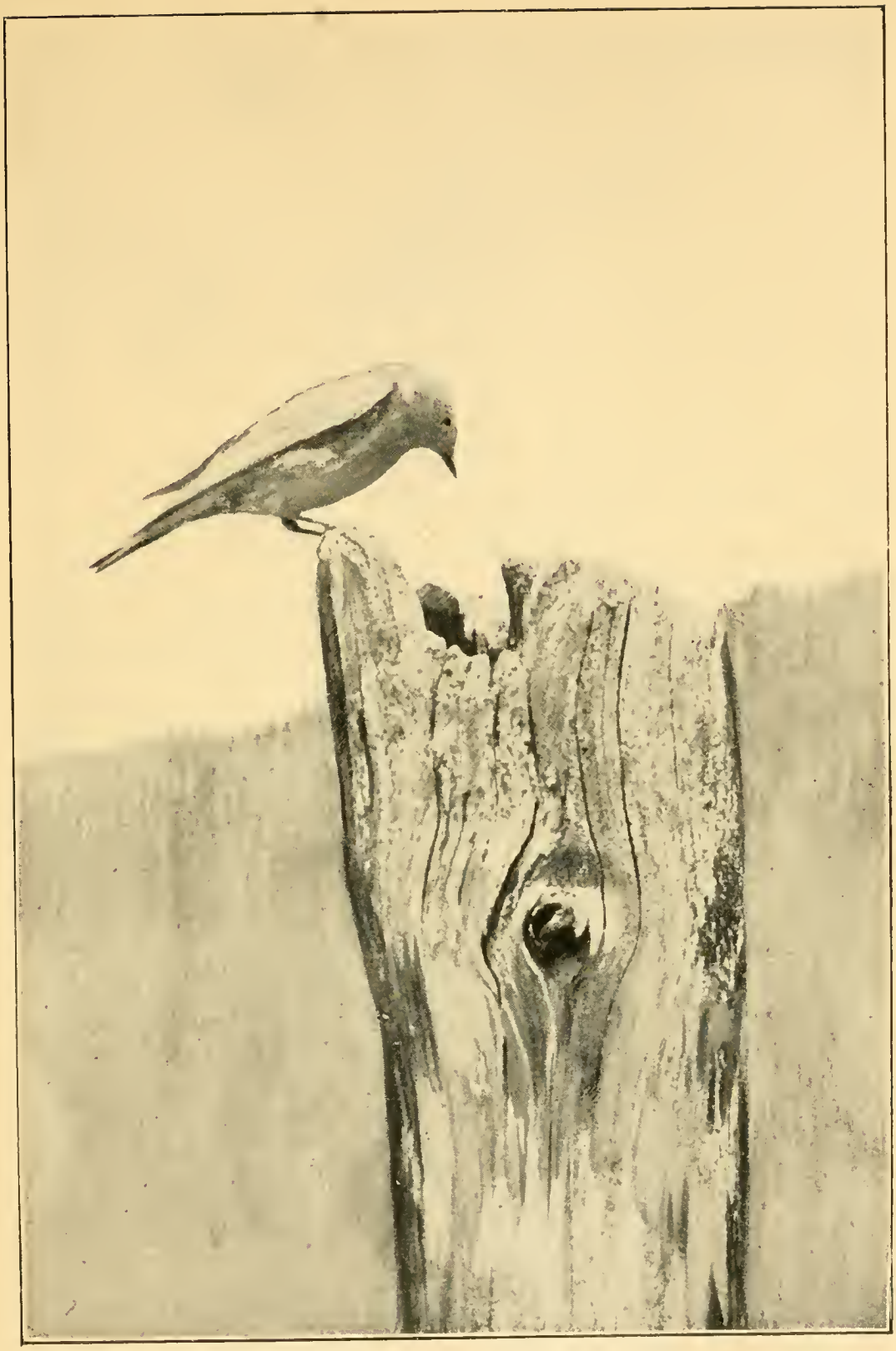


THE lengthening of the days, as the year slowly advances, brings with it increased longing for still balmier weather to every one whose pleasure is not bound within the narrow limits of the opera and *soirée*. To the lover of long rambles in the woods and meadows, or of lazy boating along some placid stream, where the water-lilies bow to let him pass and buoyantly rise in his wake, shaking the drops from their shining fronds, every indication of approaching spring is eagerly scanned, and is hailed with delight. The slow decay of

the ice in the ponds, the vivid green of the aquatic plants disclosed by its melting, the delicate herbage hiding under the sodden leaves, the gummy and bursting buds, all presage the charms of reviving nature. Then the sounds awake. The frogs bid each other good-morning after their long sleep; the lowing of calves and the bleating of lambs resound from the hill-sides; the tender warble of the bluebird, the cheery call of the robin, and the gurgle of swollen brooks mingle in our ears as we pick our way along the muddy paths; until, some bright April morning, we discover that surly Winter is gone, and coy Spring is shyly waiting for us to bid her welcome.

In this company of the heralds of this admirable change of the seasons, none have a better part than the birds, whose wings bear beauty and song. Half a dozen of these messengers—the bluebird, the wren, dove, blackbirds, and so forth —are especially first-comers, and to them I ask attention. The song-sparrow also belongs here, by good right, but he enjoys an essay all to himself elsewhere.

Among the very earliest are the familiar blue-birds; indeed, they may occasionally be found all winter long in sunny fields. By All-fools-day



A Bluebird

they have become common throughout the North, and are seeking their mates. Meanwhile, from every field, and about the yet desolate gardens, is heard the bluebird's cheery voice. It is a happy, contented warble, and, though no great credit belongs to the singer as a musician, his tender melody is among the most delightful of vernal sounds. There is a ubiquity or ventriloquistic peculiarity about this song—whether due to its quality or to the capricious breeze upon which it is usually borne, I do not know—which tends to make its source indefinite. You may hear the notes on a bright March morning, but cannot find their pretty author. He denies your eyes the welcome sight of him, until at last you give up the search only to discover him close behind you.

To no American bird will better apply Wordsworth's questioning characterization of the English cuckoo:

"Shall I call the Bird,
Or but a wandering voice?"

This unintended ventriloquism may be in his favor, but his azure plumage is very conspicuous as he stands on a tall fence-post with the woods for a background, or reconnoitres the entrance to an old woodpecker's hole in some white cottonwood,

and many bluebirds are killed by the small hawks. Thoreau said that he carried the sky on his back, to which John Burroughs added, "and the earth on his breast." This describes him perfectly.

The bluebird is not ambitious in his flight, never emulating the lofty journeys of the pointed-winged birds, and is rarely seen sixty feet above the surface. He loiters about the outskirts of the woods, flitting from stump to stump; delights in a tract of newly cleared land; and looks no further when he discovers, not far from the farm-house, a group of charred and towering trunks—monuments of a long-passed fire in the forest. Next to that he loves an aged orchard. In both places the attraction is mainly the grubs, worms, and insects that infest dead and decaying woods, and upon which he feeds. To such a spot he leads his mate, easily to be distinguished by her duller plumage. Together they go house-hunting. It is not long, usually, before they are suited; for the woodpeckers have been there years before them, chiselling out many holes for themselves which are now left vacant; or the snapping off of some old limb has opened the way to a snug cavity in its hollow interior. Any kind of a cranny seems to serve in a pinch. I have known them to build in a broken

tin water-spout under the eaves of a house, for want of a better place; although, no doubt, the birds exercise a decided choice when they can. The tenement determined upon, the furnishing of it does not require much labor or contrivance. The birds bring enough of a peculiar kind of soft grass which turns reddish brown when it dries, sometimes mix with it a little hair, and thus thickly carpet the bottom of the cavity. That is all. The eggs are laid by the second week in April, and the young are hatched about ten days after. The eggs are five in number, and are light blue, without spots. Once, in northern Ohio, I found a nestful of pearly white eggs, and other similar cases have come to my knowledge; they were just as well worth sitting on, however, as five blue eggs would have been.

The bluebird is also a true bird of the garden, taking the place of England's robin-redbreast more nearly than any other bird in America. It is no trouble to have them twittering about the house the whole summer through. The negroes at the South always have an abundance of different birds about their cabins by simply hanging up empty gourds; and a cigar-box with a hole in it is all-sufficient. But you must not be disap-

pointed if the house-wrens utterly dispossess the bluebirds of the houses you have put up, for the wrens are regular buccaneers, with no more heart or conscience than a walnut; nevertheless, the bluebirds are far better fighters than one would suspect them to be, as the English sparrow has learned at the cost of many a sore spot.

This same house-wren is so well known that I need only to allude to him; and any further description than to say that he is the wee brown bird, about as large as your thumb, which frequents the garden bird-boxes and the barn, is unnecessary. He comes early and stays late. He makes himself at home immediately, and is everywhere present, bustling about outhouses and barns, rapidly building his nest in the most insecure and unfrequented places, like the sleeve of an old coat left in the barn, or a lantern hung against the woodshed; and, if it is repeatedly pulled down, as often rebuilding it; literally "pitching into" other wrens and bluebirds and swallows, whom he considers trespassers on his right to the whole garden, and fighting so audaciously and persistently as nearly always to come off victor; squeaking in and out of every crevice, with his comical tail at half-cock; inquiring into every other living thing's business, yet not

neglecting his own, this little bobbing bunch of brown excitement is the very spirit of impudence.

The wren does not confine himself altogether to the garden, however. You may find him everywhere in the woods, and few species are equal to this in the number of individuals. An old stump that is too soft for the woodpeckers, or the hollow, broken limb of a tree that the winds have demolished, is his chosen home. Into a hole somewhere he stuffs a large quantity of twigs, some of them of astonishing size when we think how small a bird handles them. In the centre of this mass is a soft chamber, wherein six or seven brick-dust-colored eggs are hatched late in May. It is a nest which justifies his generic name, *Troglodytes,* and so fond of his queer den is he, and so restlessly active, that, when his proper home is finished, he packs full of rubbish half the crevices in the vicinity, out of a sheer want of some better way to occupy his time and ease his energy.

There is one component of this nest which is also used by the vireos and gnat-catchers — namely, round pellets of a white, cottony substance, the nature of which I was puzzled to determine. At last I caught the birds collecting it, and found it to be a minute fungus which covers dead twigs

here and there with a living velvet of snowy white. It is elastic and somewhat viscous, and with gossamer serves an obvious purpose in such a nest as the vireo's; but why the wrens scatter it through their brush-pile is not so clear.

One of my pleasantest memories is of a sparkling April morning in 1874, at Scott's Landing, a little railway junction on the Ohio River. It was bright and cold, and the wheezy steamboats passing up and down the river trailed from their tall and slender stacks great golden banners athwart the rising sun. The birds were up betimes. Crows from far and near were gathering to breakfast at the banks of the river, as is their custom at seasons of high water. The crow-blackbirds — redundancy of title!—were moving in small flocks about some newly ploughed ground, smacking their horny lips at one another over some luscious, luckless grub; and their cousins, the military redwings, were in the highest glee. Cardinals are the natural bird-feature there; and their bold whistling resounded from every hill-side. Out of the orchard came the sharp squeak of a black-and-white creeper, the noisy chatter of chipping-sparrows, and the *dee-dee-dee* of the miniature Southern chickadees. One tree was the haunt of a single

robin—*rara avis* in that locality—and he sang loud and long, not minding his loneliness. Bluebirds were not numerous, but a pair, and perhaps two families, inhabited an old cherry-tree so near to the railway-track that the tops of the passing cars pushed aside the boughs. I have noticed so many nests of birds built in close proximity to railways that I have thought the builders exercised a distinct preference for the situation, as making them safer from the attack of hawks.

Not an uncommon bird, hopping down between the rails to pick up the grain dropped from the freight-trains, was the turtle-dove, which was an old acquaintance of mine in the West, but which is rare in New England. They were very wary, uttered no note, and came with the silence of ghosts. If I only stirred when they were near—whir! away went my doves, straight and swift as an arrow, spreading their white-edged tails.

A portion of the following summer I spent on the Little Kanawha, and many a day was I entertained by the notes of the turtle-dove floating down from a hill-top as I threaded my way through the woods. Among the most common of birds in West Virginia, the people yet regarded it with affection, and made as great a disturbance if one

was shot as they would at the shooting of a house-pigeon. They were jealous of the few purple martins they had in the same degree. Why it is called the turtle-dove I do not know. Probably because of its kinship with the turtle-dove of Europe; but this only puts the difficulty one step further back. Its other name—mourning-dove—is more characteristic; for its song, if it may be called such, is a sobbing refrain, that, tolling from afar, recalls the echoing of a distant church-bell—

"Swinging slow with sullen roar."

The cry is frequently mistaken for that of some owl; but the dove does not sing at night, or some nervous people would grow wild. If it did, it would take character as a banshee, and become a bird of evil omen. On the contrary, its coming in early spring is now welcomed as one of the first signs of the sure advance of the season, and its plaintive note is only a minor tone, mingling harmoniously with the livelier notes of other denizens of the woods. In well-settled districts, where it can find food, it is more and more staying through the winter, and becoming semi-domesticated about the house and barn.

The mourning-doves pair very early, and are

as affectionate in their attachments as are most of the doves and pigeons whose "billings and cooings" have become exaggerated into a proverb to express the first enthusiasm of young love. Their home is an indifferent affair, but perhaps its very scantiness may serve to benefit its owners by making it less conspicuous among the almost leafless branches, where it is likely to be placed early in the season. The nest is not by any means always in a tree, although a snug thorn-apple offers temptations that few doves can resist; but it may be put on the flat top of a stump, on the protruding end of a fence-rail, or the eggs may sometimes be laid on the ruins of a last year's nest, as in a case I once noticed where three dove's eggs were laid in an old cat-bird's nest, around the ruins of which the snow was yet unmelted. On the plains I have seen many times how these birds scratch a few grass-stalks together on the ground, for want of a better place. It is not to be wondered at that pigeons have been easily domesticated, when they accommodate themselves so readily to any exigency in rearing their young. However placed, this nest is a slight platform of twigs, just sufficient to hold the two or three eggs; or, if the top of a stump, or the ground, be chosen

as the site, it is not uncommon to find simply a little rim, like a tinker's dam, built around the eggs, which rest on the bare surface beneath. In such a situation their gray down renders the young safely inconspicuous.

Another early and familiar visitor to the gardens is the chipping sparrow, or "chippy," its delicate voice coming to us from among the first blossoms of the lilac. It is also called the "hair-bird," because its nest is composed mainly of horse-hairs twined into a flat little basket of slender twigs and rootlets. But this is not a good name; the scientific designation—"social sparrow"—fits the bird better, for it seeks to be social with man, and places its home where every boy and girl of the family may look in at the front door. The eggs are pea-green, scrawled, as though by a pen, with black lines and dots.

The food of the chippy during the spring and summer consists largely of small insects, and he searches carefully through the blossoming trees for the minute bugs that infest the leaves and flowers, occasionally nipping off the sweet and tender stamens of the apple and cherry blossoms, or taking bites out of the early currants, but, on the whole, doing great service in payment for

A Chipping Sparrow

his trifling harm. He flits quietly and busily all over the shrubbery, an image of a happy and contented little workman, *tra-la-la-ing* in a fine, trilling voice that would be shrill were it not so sweet, an aria from some bright bird-opera.

The chippy is so easily watched that I do not propose to tell all I have learned about it, and thus rob a reader of the pleasure of learning its beautiful ways for himself. You will not find it difficult to become acquainted with these pygmy sparrows after you have recognized their chestnut caps among your rose-bushes. You will see, also, that you may tame them and teach them to come to you for crumbs. They are almost the only birds that the insolent English sparrows will be friendly towards; and they are wonderfully devoted to their young: but I am forgetting that the reader was to find all this out for himself!

I have in mind the delta of a river whose shores are so level that it is a constant struggle whether land or water shall prevail. The river finds its way to the broad harbor through a dozen or more channels, between which are low islands overgrown with great trees burdened and festooned with grape-vines and moss, and tangled with thickets and rank fern-brakes, or growths of wild

rice and luxuriant water-weeds so dense and tall as to be impenetrable even to a canoe. Here blooms the magnificent lotus (*Nelumbium luteum*), with its corolla as large as your hat and its leaf half a boat-length broad—great banks of it, giving out a faint, sweet, soporific, almost intoxicating odor.

Curious sounds reach you as you thread the mazes of the swamp. The water boils up from the oozy bottom, and the bubbles break at the surface with a faint, lisping sound; the reeds softly rattle against one another like the rustle of heavy silks, and you can hear the lily-pads and deeply anchored stems of the water-weeds rubbing against one another. More articulate noises strike your ear—the sharp, clucking lectures on propriety of the mud-hen to its young; the *brek-kek-kek, coaz-coaz* of the frog; the splash of a tumbling turtle; the rushing of a flock of startled ducks rising on swift wings; the sprightly, contagious laughter of those little elves, the marsh-wrens, teetering on the elastic leaves of the cat's-tails.

Never absent from such a reedy picture are the blackbirds, especially the redwing, whose favorite resort is where the rushes grow most densely, among which he places his nest. The little swales

in the meadows, also, where tufts of rank grass flourish upon islands formed by the roots of many previous years' growth, and stunted alders and cranberry-bushes shade the black water, are nearly always sure to be the home of a few pairs, so that they become well known to everybody, whether inland or alongshore, as soon as the ice melts. Such extensive marshes as I have just described are, however, the great centres of blackbird population, where they breed, where they collect in great hordes of young and old as the end of the season approaches, and whence they repair to the neighboring fields of Indian corn to tear open the husks and pick the succulent kernels. In September I have seen them literally in tens of thousands wheeling about the inundated wild-rice fields bounding the western end of Lake Erie, their black backs and gay red epaulets glistening in the sun "like an army with banners." The Canadian fishermen call them "officer-birds," and the impression of an army before him is always strong upon the beholder as he gazes at these prodigious flocks in autumn. It is extremely interesting to watch the swift evolutions of their crowded ranks, and observe the regularity and concert of action which govern their movements.

They move as if animated by a common and instantaneous impulse, in which no single one takes the lead or makes any suggestion, but all act independently yet absolutely simultaneously.*

The redwings are among the earliest of our vernal visitors, and south of the Ohio River and Washington may be found all through the winter. Their loud and rollicking spring note is one of the most invigorating sounds in nature, and most typical of the reviving year. *Conk-quirée! conk-quirée!* sings out the male, as though he knew a good story if only he had a mind to tell it; and then adds *chuck!* quite as if he thought it of no use to try to interest you in it, and that he had been indiscreet in betraying an enthusiasm beneath his dignity over a matter beyond your appreciation. His plain brown mate immediately says *chuck!* too, quite agreeing with her lord and master that it is not best to waste their confidence upon *you*.

*This idea of a "common mind" in the flock has been present with me ever since, as a boy, I watched these blackbirds and other flocks, and speculated upon their movements; but it has always seemed too fanciful for serious consideration. Yet in a late book, *Bird Watching*, by Edmund Selous (London, 1901), it is propounded and discussed at length in reference to English birds.

The centre of all their interest is the compact, tight basket, woven of wet grass-blades and split rush-leaves, which is supported among the reeds or rests on a tussock of wire-grass surrounded by water. It is a model nest, and they understand so well the labor it cost that they are mightily jealous of harm coming to it. The eggs are five in number, of a faded blue tint, marbled, streaked and spotted with leather-color and black, in shape rather elongated and pointed. The fledglings are abroad about the 1st of June, when the parents proceed to the production of another brood.

These blackbirds have the bump of domesticity largely developed, and if their household is disturbed they make a terrible fuss, calling upon all nature to witness their sorrow and execrate the wretch that is violating their privacy.

During all the spring season, and particularly while the young are being provided for, the redwings subsist almost exclusively on worms, grubs, caterpillars, and a great variety of such sluggish insects, and their voracious larvæ, as do damage to the roots and early sprouts of whatever the farmer plants; nor do they abandon this diet until the ripening of the wild-rice and maize in the fall. "For these vermin," says Wilson, "the starlings

search with great diligence, in the ground, at the roots of plants, in orchards and meadows, as well as among buds, leaves, and blossoms; and from their known voracity the multitudes of these insects which they destroy must be immense. Let me illustrate this fact by a short computation: If we suppose each bird on an average to devour fifty of these larvæ in a day (a very moderate allowance), a single pair in four months, the usual time such food is sought after, will devour upward of twelve thousand. It is believed that not less than a million pairs of these birds are distributed over the whole extent of the United States in summer, whose food, being nearly the same, would swell the amount of vermin destroyed to twelve billions. But the number of young birds may be fairly estimated at double that of their parents; and as these are constantly fed on larvæ for three weeks, making only the same allowance for them as for the older ones, their share would amount to $4\frac{1}{5}$ billions. making a grand total of $16\frac{1}{5}$ billions of noxious insects destroyed in the space of four months by this single species! The combined ravages of such a hideous host of vermin would be sufficient to spread famine and desolation over a wide extent of the richest, best-cultivated country on the earth."

The yellow-headed blackbird, a kinsman of larger size, belongs properly northwest of Lake Superior, but frequently gets into Michigan and Illinois. The bright-yellow head and neck make it very noticeable if seen. Its habits are essentially those of the redwing.

We have another set of blackbirds in the Atlantic States, of greater size than the redwings, commonly known as "crow"-blackbirds, but called "grakles" in the books. There are several species, but none are greatly different from that too-common pest of our cornfields, the purple grakle.

The real home of the grakles, although along the edges of the swamps, is not among the reeds where the redwing and bobolink sit and swing, but rather in the bushes and trees skirting the muddy shores. They build their nests in a variety of positions, but usually a convenient fork in an alder-bush is chosen, twenty or thirty pairs often dwelling within a radius of a hundred feet. The nest is a rude, strong affair of sticks and coarse grass-stalks lined with finer grass, and looks very bulky and rough beside the neat structure of the redwing; which illustrates how much better a result can be produced by an artistic use of the same material. In the case of these, as well as the red-

winged blackbirds, however, the female does not wear the jetty, iridescent coat which adorns the head of the family, and reflects the sunlight in a thousand prismatic tints, but hides herself and the home she cares for by affecting a dull, brown-black, streaked suit, assimilating her closely with the surrounding objects. This protective coloration of plumage is possessed by the females of many species of birds, which would be very conspicuous, and consequently greatly liable to danger while incubating their eggs, if they wore the bright tints of the males. The tanager and indigo-bird afford prominent examples. Sometimes the crow-blackbirds make their homes at a distance from the water, and occasionally they choose odd places, such as the tops of tall pine-trees, the spires of churches, martin-boxes in gardens, and holes in trees.

Crow-blackbirds' eggs are among the first on every boy's string, and until he gains experience the young collector supposes he has almost as many different species represented as he has specimens, so much do they differ, even in the same nestful, in respect to color, shape, and size. Their length averages about 1.25 by .90 of an inch, but some are long, slender, and pointed, while others

are round, fat, and blunt at both ends. The ground color may be any shade of dirty white, light blue, greenish, or olive brown; the markings consist of sharply defined spots and confused blotches, scratches, and straggling lines of obscure colors, from blue-black to lilac and rusty brown—sometimes scantily and prettily marbled upon the surface of the egg, and sometimes painted on so thickly as wholly to conceal the ground color.

The crow-blackbirds are in the advance-guard of the returning hosts of northward-bound migrants, making their appearance in small scattering flocks, and announcing their presence by loud smacks frequently repeated. They obtain most of their food from the ground, and walk about with great liveliness, scratching up the leaves, turning over chips, and poking about the pastures for insects and seeds softened by the spring rains. Their destruction of insects — especially during May, when their young are in the nest—is enormous; yet their forays upon the grain-fields in some parts of the country have made them a pest to be hated.

"The depredations committed by these birds are almost wholly on Indian corn at different stages. As soon as its blades appear above the ground

after it has been planted, the grakles descend upon the fields, pull up the tender plant, and devour the seeds, scattering the green blades around. It is of little use to attempt to drive them away with a gun: they only fly from one part of the field to another. And again, as soon as the tender corn has formed, these flocks, now replenished by the young of the year, once more swarm in the cornfields, tear off the husks, and devour the tender grains." Wilson saw fields in which more than half the corn was thus ruined.

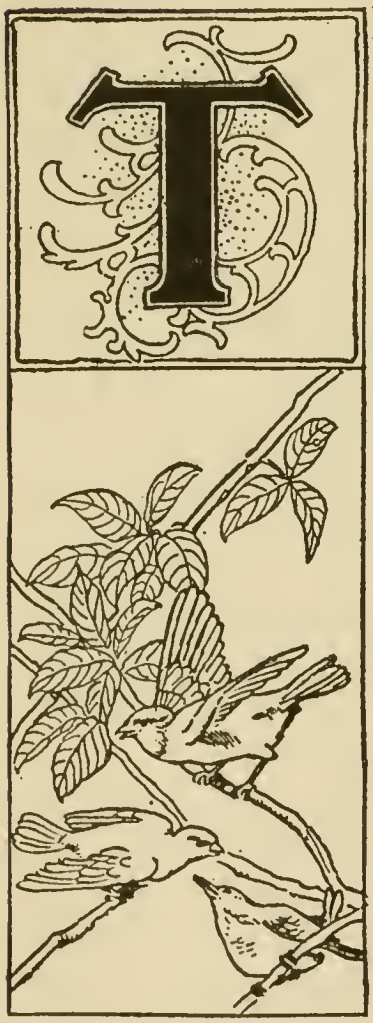
In view of this charge, the food of this blackbird was thoroughly investigated by Professor F. E. L. Beal, of the Department of Agriculture, and his report was published in the Year-book of the Department for 1894. His conclusion, after collecting a great amount of evidence, including an examination of the contents of over two thousand stomachs, was that rather less than half of the food of the birds is of grain, and the remainder almost wholly insects, of which two-thirds are of noxious kinds. The conclusion is that they serve a very useful purpose in the general bird-work of keeping down the insect hordes, but that when they descend upon the young cornfields in crowds they must be driven off or killed, like any other

nuisance. This does not mean, however, that a general war of extermination on grakles is advisable—it would be distinctly unwise.

These birds winter in immense numbers in the lower parts of Virginia, North and South Carolina, and Georgia, sometimes forming one congregated multitude of several hundred thousands. On one occasion Wilson met, on the banks of the Roanoke, on the 20th of January, one of these prodigious armies of crow-blackbirds. They arose, he states, from the surrounding fields with a noise like thunder, and, descending on the length of the road before him, they covered it and the fences completely with black; when they again rose, and after a few evolutions descended on the skirts of the high-timbered woods, they produced a most singular and striking effect. Whole trees, for a considerable extent, from the top to the lowest branches, seemed as if hung with mourning. Their notes and screaming, he adds, seemed all the while like the distant sounds of a great cataract, but in a musical cadence.

VIII

THE SONG-SPARROW



THE American song-sparrow is a peculiar lover of old fields where Nature is fast reasserting herself after the temporary rule of man. The tumble-down, lichen-patched stone fences; the gray cattle-paths diverging from the muddy bar-way to those parts of the pasture where the grass is sweetest; the weedy banks of the sluggish brook winding indolently among mossy bowlders and tangled thickets and patches of fragrant herbage—are all congenial to it, and are its chosen resort. Yet it is so common throughout most of the United States that

you may find it almost anywhere—skulking about the currant and raspberry bushes in the village gardens; taking a riotous bath in some pool by the road-side, about whose rim, perhaps, the ice still lingers; hastening to the top of a forest tree to plume its dripping feathers and shake off at once crystal water and a crystal song.

Our favorite is the very first bird to greet us in the spring—in fact, many remain through the winter as far north even as Boston and Lake Erie. It is thought by ornithologists, however, that the winter song-sparrows are not the same individuals that were with us in summer, and which have gone southward, but are inhabitants of more northern latitudes, that have come down with the snow-birds; and it is said that these are far hardier birds, better and more versatile musicians.

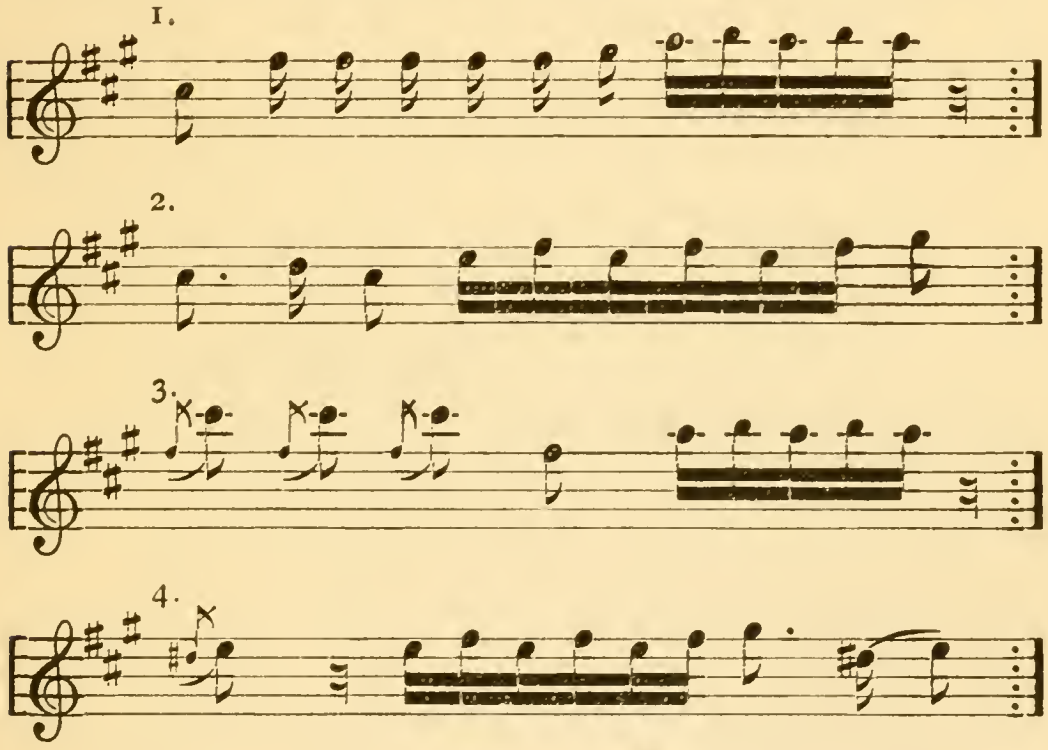
During the winter the song-sparrow remains, quiet and busy, along the edges of the woods on warm hill-sides in company with the spotted woodpeckers and snow-birds, or associates with the fowls in the barn-yard for a share of the housewife's bounty. But as the March snow melts, and the sun sends genial warmth to awaken the buds, he mounts the topmost twigs of the brush-pile whose labyrinths he has spent the winter in

exploring, and pours forth a rapturous welcome to the couriers of summer. Then through all the spring days, whether they be shady or sunny, from early morn till long after sunset, are heard the sweet and cheery cadences of his song, thrilled out over and over again like a canary's. He starts off with a few low, rattling notes, makes a quick leap to a high strain, ascends through many a melodious variation to the key-note, and suddenly stops, leaving his song to sing itself through in your brain. To amplify another's illustration, it is as though he said, "Press-*press*-PRESS, BY-TEEEE-RIAN-*ian!*" His clear tenor, the gurgling, bubbling alto of the blackbirds, the slender purity of the bluebird's soprano, and the solid basso-profundo of the frogs, with the accompaniment of the April wind piping on the bare reeds of winter, or the drumming of rain-drops, form the naturalist's spring quartette—as pleasing, if not as grand, as the full chorus of early June.

The song of the sparrow varies in different individuals, and often changes with the season. A single bird has been observed through several successive summers to sing nine or ten different sets of notes, usually uttering them one after another in the same order over and over. Careful

attention will show almost any of our songsters to vary their melodies from time to time, but none have greater individuality than our subject.

In that interesting record of bird songs by the musician Cheney, entitled *Wood Notes Wild,* the author gives the notation of some twenty different melodies by a single performer; and offers the following distinct songs which he says he heard from a single song-sparrow within twenty minutes:



"Last season," writes John Burroughs, "the whole summer through, one sang about my grounds like this: *'Swee-e-t, swee-e-t, sweet, bitter.'* Day after day, from May to September, I heard

this strain, which I thought a simple but very profound summing-up of life, and wondered where the little bird had learned it so quickly. The present season I heard another with a song equally original, but not so easily worded. Among a large troop of them in April, my attention was attracted to one that was a master songster—some Shelley or Thomson among its kind. The strain was remarkably prolonged, intricate, and animated, and far surpassed anything I ever before heard from that source."

Occasionally the song-sparrow sings on the wing while dropping to the ground from the top of a high tree—a favorite perch in early spring; and during the mating season many strange modifications of his tune strike the ear. As the summer comes on, his song, in common with that of all other birds, is less often repeated until it almost ceases in the fall; yet it may be heard, by an observing listener, every month in the year. His call to his mate is a simple *chuck* or *hwit*.

Rarely leaving his native copses until late in autumn, he has little need to exert large powers of flight, and moves from one low bush to another with a jerking, undulatory motion. His home is near the ground, and it is only the excitement

of love which in spring prompts the males to seek the tree-tops.

His food is principally procured from the ground and among the branches and leaves of the wild shrubbery, and consists of blossoms, seeds, berries, and insects, varying according to the season and the age of its nestlings. Early in spring he is, as Mr. Gentry puts it, "a vegetarian," living upon the blossoms of the red maple and other early-blooming forest trees, green ginger-berries, and the seeds of vegetables, in search of which it frequents the kitchen-gardens, and associates with the noble fox-sparrows and chattering goldfinches. As warm weather advances, the song-sparrow leaves the gardens, and seeks, in wilder spots, less of vegetable and more of animal food—eating strawberries, wild cherries, raspberries, etc., now and then as a relish; but depending for regular fare upon the young of the insect world just hatching out. It would be quite impracticable to enumerate all the kinds eaten; probably everything palatable is welcome. I remember one June day watching one little fellow industriously picking very minute lice-like bugs from the under-side of the leaves of an apple-tree. He seemed inordinately fond of them, and swallowed twenty or thirty a minute,

uttering the while a quick, metallic chirp. Many kinds of caterpillars he likewise devours, among them clothes moths and the loathsome tent-caterpillar, that stretches its canopied webs among the twigs of our orchard and shade trees, and drops down upon our heads in all its ugly nastiness; also ants, earthworms, and young beetles.

When the insects mature, and betake themselves beyond his easy reach, small fruits still remain; and, as these gradually disappear, he gives himself up more and more to a strictly graminivorous diet, breaking open the seed-vessels stored up by the wilderness of weeds growing in every field which the farmer has let "run to waste" for himself, but has thus cultivated the more for the sparrows. There is always enough of this material, either in the unbroken pods or fallen to the ground, to last through the winter such adventurous birds as brave our snows, screening themselves from the chilling blast in recesses of the dense thickets, or taking shelter under piles of logs and brush.

During the latter part of April, in ordinary seasons, the song-sparrow finds himself married, and he and his wife begin to construct their home. The site chosen is the green bank of some meadow brook, a tussock beside a country road, a hollow

Song Sparrow Feeding her Young

under some decaying log, where the nest shall be well secreted in a little thicket of grasses and flowers, or, in many cases, on bushes, vines, or even, as Mr. J. S. Howland assured me, in an old broken woodpecker's hole in an apple-tree. A friend in Astoria, L. I., on May 8, 1877, found a pair of these sparrows snugly ensconced in an ivy growing along the inner wall of a green-house. The birds had evidently watched their opportunity when the door was opened or the glass raised during the warm days, and constructed their nest and deposited three eggs before they were discovered. In 1875 they built a nest in the same place, and the year before on the ground against the wall just outside. A pair had been around there for a great while, a nest being found within a hundred feet of the spot for some six or seven years. Wherever placed, it is a model and poetic bird-dwelling.

"What care the bird has taken not to disturb one straw or spear of grass or thread of moss! You cannot approach it and put your hand into it without violating the place more or less, and yet the little architect has wrought day after day and left no marks. There has been an excavation, and yet no grain of earth appears to have been

moved. If the nest had slowly and silently grown, like the grass and the moss, it could not have been more nicely adjusted to its place and surroundings. There is absolutely nothing to tell the eye it is there. Generally a few spears of dry grass fall down from the turf above, and form a slight screen before it. How commonly and coarsely it begins, blending with the *débris* that lies about, and how it refines and comes to the centre, which is modelled so perfectly and lined so softly!"

Grasses are the timbers of the house—coarse stalks upon the outside, fine stems and soft leaves twined within; the edge of the nest overcast. It seems to be well proved that the nests found on the ground are built by young birds, while older and more experienced sparrows place their houses in vines and small trees, finding that at a little height they are less liable to danger; furthermore, these nests built at an elevation, being more exposed to the wind and less braced, are more compactly and skilfully constructed than those on the ground, the projecting ends of the straws being neatly interwoven, or tied down, so as to present a tolerably smooth exterior. The nests in the tussocks seem manufactured chiefly out of the dead stems of crab-grasses and other stuff with-

in easy reach; but a variety of substances enter into the composition of the elevated nests, such as flowering weeds, narrow leaves, paper, strips of bark, and raw cotton (which sometimes thatches the whole outside), with horse-hair and milk-weed silk to give additional softness to the lining. When circumstances favor, a sort of sheltering platform is arranged over the nest in the tree or vines; just as frequently the approach to the nest hidden in the meadow lies through a tunnel like a field-mouse's path under the tall grasses.

The labor of building occupies the attention of the pair during the cool of the mornings and evenings of four or five busy days. Both birds work diligently, the male bringing the materials and the female adjusting them. The day after the nest is done an egg is laid, and one more each succeeding day until there are five; and very hard to distinguish from the eggs of several other ground-building sparrows they are. The ground-color runs through all intermediate tints from grayish or brownish white to decided green. The blotching is generally profuse, and often confluent into a wreath about the large end, the colors being underlying purples and bright-brown surface painting. They are inclined to be thick and blunt

rather than elongated, and will average about .90 by .60 of an inch. I can find no variations worth stating between the eggs of the different varieties. Those from the Pacific coast appear to be the largest, and those from Southern localities the smallest; but the variety in size, shape, ground-color, and pattern is almost limitless, and I repeat that the strongest identification is necessary to make sure between these eggs and those of the swamp-sparrow, the grass-finch, the white-throat, and several other members of the family.

The female sits eleven or twelve days, occasionally relieved by the male while she takes a brief rest. He assiduously provides her with food from hour to hour, but spends all his leisure at home, ready to resist invasion or insult, and enlivening the tedium of her sitting with his love ditties.

When the young are born, both parents are exceedingly devoted to their wants, carefully removing every trace of the old egg-shells and all foul matter far from the nest, and working with great energy to keep the hungry mouths filled. The nestlings are fed upon the young of many small insects, and as they grow older are given larger larvæ, earthworms, house-flies, plant-lice, ants, and small night-flying moths. When twelve

or thirteen days old, the young birds leave the nest, and in ten days more have learned to care for themselves. Meanwhile the mother has abandoned them to the father's guidance, and busies herself in the construction of a new home for a second family. Although left strong and neat, the first nest rarely seems to be used again; but the new one is built in close proximity to it. As before, the male is dutiful and loving, and the second brood is brought out in July, or sometimes earlier, so that even a third brood may be raised; but accidents or climate usually prevent this degree of success.

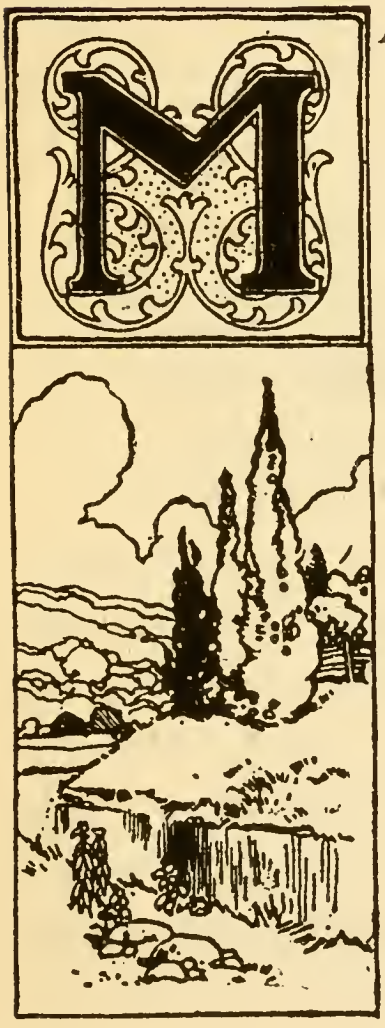
In autumn the song-sparrows are to be seen dodging about stone walls, road-side thickets, and old pastures, in little family companies of six or eight, no doubt consisting of parents with their second brood of young, which remain together in happy idleness, and move southward at their leisure.

Here the younger sons appear to have an advantage over their elder brethren of the first brood, who are early sent out to seek their fortunes, in that they enjoy the continued example and counsel of their parents during many weeks after they may be said to have "come of age," although pos-

sibly they may chafe under the restraints of paternal guidance, not to say old-fogyism, from which the youngsters of the first brood are now gayly delivered; but it would not be wonderful if it could be shown that the next year this latter brood, profiting by distasteful discipline, excelled in nest-building and in general prosperity over the others, who have enjoyed less advantages in the way of home education.

IX

COURTING FICKLE MAY



MAY in our Northern States is the neutral ground between winter and summer, the scene of their airy battles, to be followed by the flowery peace of June. In its practical aspect, in its relation to agriculture and work, it is a season of uncertainties, hopes, and disappointments, and of ups-and-downs not only in the thermometer, but in rural minds. The thrasher comes and bids the farmer plant, but straightway clouds lower, the wind goes wrong, and he hesitates. Then the finest of weather follows, and he regrets his inde-

cision only to rejoice when the veering gale again brings a wasting storm.

These are the moods and scenes the poets of tradition attribute to April, but they belong to May. The poets refuse to have their muse localized or to range themselves with isothermal lines and records of meteorology. Probably they were right originally in Europe, but in the United States it is May when their "April" doings really happen. Somebody ought to make a corrected calendar for the use of American "nature-poets." Yet Lowell appreciated the facts, to wit:

> "When oaken woods with buds are pink,
> And new-come birds each morning sing,
> When fickle May on summer's brink
> Pauses and knows not which to fling,
> Whether fresh bud and bloom again
> Or hoar-frost silvering hill and plain."

But towards the end of this month—when the fatal 10th has been safely passed—May quits her coquetry, and, now sweet and sincere, smiles with the surpassing loveliness of youth. Steadily, hopefully, the leaves and buds have struggled against the waning but vicious enmity of winter, and day by day, though often hindered and checked by adverse weather, have struggled forward. The

Wood-thrush in its Nest on a Stump

grasses and weeds have made good headway, and the fruit-trees, the maples, the witch-hazel, and other adventurous trees and shrubs are in full leafage by the middle of the month, so that the roadsides and gardens and orchards seem finished. The woods, however, are still scantily apparelled, and, seen at a distance, have a gray, rusty aspect that tells what a multitude of naked twigs still remain.

The lengthening and more and more sunny days remedy this rapidly, and an exuberance of verdure soon clothes the earth, yet the realization that "summer is a-comin' in" is always sudden. We are never quite prepared for long-anticipated events when at last they arrive. After a long southerly rain, ushered in by a thunderstorm and wearing itself out in drizzle and mist and gloom, we awake one morning to find the sun glorious again, the air washed almost to the clarity of a vacuum, and a delicious breeze flowing out of the west. Loudly to our ears, then, comes the roar of the little cataract half a mile away, swollen to a torrent that overflows the rocks with nut-brown water—not roiled, but stained by cedar and hemlock roots — and we think of out-door photography and of fishing.

"Then weary seems the street parade,
And weary books and weary trade:
I'm only wishing to go a-fishing—
For this the month of May was made."

We are struck by the new verdancy of the world as our eyes stray across the valley. The grass at our feet and the spruces close by are dark, with a tinge of bluish, perhaps, and the squares of young grain and pasture bounded by shadowy lines that mean stone walls are in varying tones of emerald; but all the wide forest-space elsewhere is softest, lightest leaf-green, almost yellow in the billowy high-lights, and having a luminous quality exceedingly refined and fresh. This is due to the thinness, and consequent translucency, of the young leaves, as we see when we look closely at those over our heads, which glow almost like flakes of greenish-yellow glass.

Where chestnuts show themselves, the little, new, five-fingered leaves, fringing the twigs and sketching in what the tree will presently become, are as yellow as they will again be in October, and the unblemished sky beyond them takes a violet hue of royal richness. Let an indigo-bird flit through these flecks of gold and he becomes a veritable gem. The oaks are putting forth, as

yet, only little, wrinkled babies of leaves, each exquisitely browned and varnished along the edge, while the midrib remains a rich green, so that each is like some quaint Japanese device stamped out of their red bronze. The maples, too, are reddish at first, and thus the nearer thickets, where these two kinds of trees prevail, show an autumnal gloss of warm brown and dashes of crimson mingled with the pure verdure of their fellow-shrubs; but at a distance all this blends into the season's broad effect of greenish yellow.

What could be more fit amid such delicate leafage than the silky, olive-gray coats of that exquisite among our birds, the greenlet or vireo? One sits near me in the top of a black birch—a tree fraying out into hair-lines of fine twigs atop, like a pointed brush—and twitters a gay *chanson* over and over, careless whether I listen or not. It *must* be French, and very likely he picked it up last winter in some one of the Gallic Antilles from that loquacious race which has carried the art of saying pleasant things to its highest point. All the words I can recognize are *chère amie* and *dix-huit*—the latter very plain, and with the final *t* rather too evident. Perhaps his little dear is just eighteen! A distant dog's barking stops his

music, and he says *keerie?*—cocking a red eye inquiringly, and then falls busily at picking minute insects off a sticky young hemlock cone, as if he thought he really must attend a little while to business, despite the charm of this soft morning, luring towards the "pleasant land of Idlesse." But presently he begins again—"*Chee, chee! ter whée! rit rit! cheery! pz'teét! cheery! terreé! chezer whée! ru-ru!*" and so on, sweetly o'er and o'er.

May is the month of juvenescence. Infancy is passed. Nature, as a young giant, feels its strength. The seed-time and sprouting and preparation of winter and early spring are passed, and the gathered powers are now to be exercised that fruition may follow. There is a sturdy rejoicing at the putting forth of effort. The living, growing world seems eager and enthusiastic. It is this sense of arousing, and of beginning in earnest the activity of the year, that distinguishes this month out-of-doors, inspiring all who go abroad, and communicating to them the impulses of nature.

Now is the era of yellow flowers, as was April of white ones. Dandelions still bejewel the lawn. Out of the lush meadow rise great, globular tufts

of golden mustard, and lower down creeps the modest potentilla and yellow violet, hastening to get through their duty of blossoming before the vegetation shall smother them. Wild indigo and the polished buttercup and the marsh-marigold, beloved of the goldflies, with many another one, both garner and reflect the hue of the blessed new sunshine.

Nevertheless, though otherwise the most energetic of months, May breeds indolence in men. The warm, languorous afternoons, damp with the odorous emanations of a moist earth and the exhalations of ever-increasing leaves, the debility of heat unprepared for and the accumulated weariness of busy months past, combine to depress our activity and to make lassitude welcome. Hence May is perhaps the most restful month for the man in need and in search of refreshment—rest is then so easily taken, so apt to his mood. The mind is gratefully recreated as well as the body. The delights of perfected spring appeal to the intellect and imagination as well as to the senses; the joy of "seeing things grow," the daily, almost hourly change to be noted as nature's brush rapidly and deftly puts its finishing touches on the landscape —all these are charming influences drawing tow-

ards the idleness which permits human regeneration.

I want no book nor companion to soothe me, then, when I go out and lie down in some woodland nook to watch the warblers, for these are warbler days in the forest and by country roads and village gardens. Tiny creatures in brilliant and unfamiliar feathers illumine the fresh green of the newly leaved trees, and dart like glowing gems among the white and carmine apple-blossoms, or scatter the paler bloom of cherry or dogwood. There are dozens of kinds and hundreds of individuals. In the balmy stillness of this remote hill-side attentive ears detect a continual murmur of faint, sweet bird-notes, some afar, some close at hand. Many are mere clicks, like the striking together of small pebbles—softly metallic exclamations by which the members of some little band of travellers are keeping in touch as they flit about in search of the small insects upon which they feed, yet ever anxious to move on northward, however leisurely. Probably they have been winging their way hither all night through the velvety darkness that palled the world while we slept, and will be off again when twilight once more slowly closes the eyes of day.

Into this soft medley comes from afar the pert questioning of a chewink, or the mocking laughter of some ribald flicker on the top of the ridge, the raucous cries of bluejay and crow, or perhaps even the sharp scream of a broad-winged hawk, hushing for a moment all the minor bird-voices in frightened apprehension.

Down by the stream, where the muskrats are teaching their mouse-colored youngsters to swim, and showing them the beds of the clams and the edible roots of water-lilies, the warblers find their best feeding-ground.

Sit down quietly here, and in a moment—before you have finished watching that water-snake ingeniously getting possession of a bit of a dead and stranded minnow he has found—one and another of the tiny singers will flit close to you, so that you may make sure of their plumage, learn their pretty ways of life, and memorize somewhat of the burst of song with which, more and more as the season advances, they salute their approaching happiness.

Here you will see, perhaps, in quick succession, the two black-throats—the green and the blue. The latter is habited in cadet-gray, but his lower parts are brilliant white and his throat velvety

black, extending up around his eyes. He has little to say, but is a diligent hunter, and it is most amusing to watch him carefully searching a bush from top to bottom before darting to the next one and giving it the same painstaking inspection. He is elegant rather than beautiful; but the black-throated green warbler is a real dandy. His throat, too, is an arrow-head of pure black, with the point under his bill and the barbs reaching back to his wings, leaving the sides of the head clear yellow; the back is olive-green and the under parts are almost white, while the tail has a conspicuous white patch on each side.

This is an exceedingly striking costume; nor is the song one to escape notice. Bradford Torrey says it means *Trees, trees, murmuring trees*—but you must pitch your voice high in repeating it, with a sudden drop on the long word. Another note is a rapid rattle, a perfect imitation in miniature of the *cr-r-r-r-r* of the kingfisher.

Nearly all the warblers give a *zeee*-ing call, very confusing to the beginner in ornithology, but after a while he learns that each species has a little song of its own, uttered in a nonchalant way, and presently he becomes able to recognize them apart. Yet there always remain some that are doubtful

to the ear. Thus the myrtle-bird, always common in the spring in the North, has such a nondescript prattle that no one can be quite sure of the singer till he sees it. This is the bluish, golden-backed warbler that often assembles in huge flocks along the Gulf coast in early winter.

The chestnut-sided is another exquisite passenger through the May woods, known at a glance, not only by his bright-yellow cap, but by the splashes of rich chestnut red on his streaked sides. He is an active fellow, working away on his own hook, while most of his rivals associate in loose companies of friends, and he stops now and then to utter clear whistles that remind you of the self-satisfied garden gossip of the summer yellow-bird. The chestnut-sided's voice is more often heard, nevertheless, in an eager "*Wichity, wichity, wee-wee-wee-n,*" finally running up into a thin squeak.

The shrillest, keenest note of the woods, however, as fine as a cambric needle, as sharp as the rays of light that penetrate the leafy roof and gild the forest carpet, is that of the redstart, seen everywhere during May and June, in the forest as well as along the road-side or about house and park. Its shriek—"*Sree, sree, sree, sréeah*"—pierces the hot silence of the early summer days from bush and

tree-top alike, and its motley of red, orange, and black is as brilliant and conspicuous as are the columbine blossoms nodding against these gray rocks.

Here comes one now, tossing himself upon a low branch of the hornbeam near me, then looking carefully around, as if to learn whether anybody noticed him. Suddenly he leaps out, circles a foot or two, turns a sommersault, and returns to his perch. An instant later he flits to another, but has hardly alighted before he dives headlong to the ground, makes a quick sideways dash, and I hear the snap of the bill which closes prematurely the brief career of some mite of the sunbeam.

Hardly has it left, when a scarlet tanager dashes past like a volant ruby, and then I hear a sound like the clicking of a gunlock, with a curious *kz* ending, and turn to see a fly-catcher sitting bolt upright in a tree beside my mossy couch. The bird jerks up its head violently every time he speaks, just as if hiccoughing the notes out. Poor tipsy little chebec !

Smaller objects engage one's attention as he rolls lazily over and turns his eyes to the ground. A wonderful liliputian world is the grass. Lie still some day upon your elbows, make a circle of your arms, and try to count all the different plants and

busy creatures you have corralled. Watch the minute insects and creeping things attending to their business among the chrysoprase columns of the grass-stems, and beneath the umbrage of clover and sorrel and violet. You shall see what you shall see, and it will be worth your while!

But this is too much effort now. I want to do nothing—to pay attention nowhere, by effort. That gleaming scarlet wriggler is a timid, helpless, baby salamander, defying every law of protective coloration by glowing like a coal of fire, whether he crawls among the fresh herbage or over the sodden old matting worn out beneath winter's feet. I need but turn my head to see his elder brother in dusky green swimming along the shallow bight, where an eddy of brook-water rests quietly for a moment. This gaudy youngster, if he live another year or two, will tire of his travels ashore and go into the water and turn green also. Salamanders are not like men. They are greenest when they are adult. It is upon the cards of their youth instead of on the grave-stones of their old age that they write:

"As you are now
So once was I;
As I am now
So you must be."

The country people say that the clear, sweetly whistled call so often heard in wet woods these days is the cry of this tiny red innocent, but it is not. That flutelike note is the call of the toad, who is late in his wooing.

Here comes hopping that exquisite of his race, the wood-frog, dressed in buff and black. He is done with his honeymoon and its troubles, and, a bachelor again for the nonce, is travelling contentedly back to the dry uplands, free of responsibility and the pricks of either love-longing or conscience. A blue butterfly flutters near him, and then a larger one, chestnut and black, wavers down from somewhere, whereupon the blue one rises and drifts away sidewise before an invisible breeze, showing hauteur in every motion. The light is just right to be reflected from the bottom of the creek, where it is perhaps eighteen inches deep near shore, and I see a pair of perch at work upon their nests. They—

But here! This won't do. It is not my day for observation. I don't want to *study*. I want only to feel, and—bless me! it is lunch-time, and —I must really have been asleep half an hour!

X

WILD MICE

WHEN every stream in its penthouse
Goes gurgling on its way,
And in his gallery the mouse
Nibbleth the meadow hay;

"Methinks the summer still is nigh,
And lurketh underneath,
As that same meadow-mouse doth lie
Snug in that last year's heath."—THOREAU.

WALKING about the fields, I come upon tiny pathways as plain as Indian trails, which lead in and out among the grass and weed-stalks, like roads for the tiny chariots of Queen Mab.

These curious little paths, branching here and there, and crossing one another in all directions, are the runways of the field-mice, along which they go, mostly after sunset, to visit one another or bring home their plunder; for the thieving little gray-coats of our cupboards, whose bright eyes glance at us from behind the cheese-box, recall in their now naughty tricks the natural and innocent stratagems of their wild ancestors. This plague of the neat housekeeper was originally a native of some Eastern country, but has now spread all over the world and made himself altogether too much at home wherever civilized men have established themselves. In this country, moreover, he has taken to the fields in many places, and dwells there, under stacks of corn and in similar places, like a wild mouse; but he is rarely if ever seen in the woods. In this wild life he is changing and developing local varieties of great interest to the thoughtful naturalist.

As for our native American wild wood-mice, a catalogue of all the different kinds known in the whole of the United States would be a long one; and there are, perhaps, a score or more species and subspecies east of the Mississippi River.

They are comprised in two families, the *Zapo-*

An Observing Gopher

didae, or jumping-mice, and the *Muridae,* or family of the true rats and mice.

The former tribe contains two species, *Zapus hudsonius* and *Zapus insignis*—the latter being somewhat larger than the former, and inclining more to the woods than its relative, which is mainly a mouse of the valleys and meadows. Both these species have cheek-pouches and are classified near the gophers.

These jumping-mice are the prettiest of all the Eastern wild species. If you should look at a kangaroo through the wrong end of a telescope, you would have a very fair idea of our little friend's form, with hind legs and feet very long and slender, and fore-legs very short; so that when he sits up they seem like little paws held before him in a coquettish way. His tail is often twice the length of his body, and is tipped with a brush of long hairs. He has a knowing look in his face, with its upright, furry ears and bright eyes. Being dark brown above, yellowish brown on the sides, and white underneath, with white stockings, he makes a gay figure among his more soberly dressed companions; yet his fur is notably coarse and rough. Various names are given him, such as the wood-mouse, kangaroo-mouse, and others.

Of the *Muridae* we have in the eastern half of the United States the muskrat; the large nest-building wood-rat (Southerly); the queer lemming-mouse (*Synaptomys*) of the West; the diminutive gray harvest-mouse (*Ochetodon*) of the prairies and westward; the long-eared red-backed mouse (*Evotomys*), which is mostly Canadian; and the two genera *Microtus* and *Peromyscus*, whose representatives are our most common field-mice.

The genus *Microtus* includes a great tribe of voles scattered over most parts of the world, of which no less than seventy different species and varieties are recognized in North America alone by the latest monographer; which simply shows how numerous and widespread they are and how each locality impresses the voles that dwell there with some more or less noticeable peculiarity of color or proportion of parts. Thus the voles that dwell on Gull Island, at the entrance to Long Island Sound, and those on little Muskeget Island, near Nantucket, are each given specific names to mark the differences that their isolated life has brought about in the course of time. With these fine distinctions the reader need not disturb his mind, but content himself with remembering that in the East all the voles, or meadow-mice, are more or less varieties of

either the common meadow-mouse (*Microtus pennsylvanicus*) or of the Southerly pine-mouse (*Microtus pinetorum*); and that in the Mississippi Valley he may find the "peppery-gray," yellow-bellied prairie vole (*Microtus austerus*).

These meadow-mice are the "homeliest" of their tribe. Their coats are coarse in texture and dull in hue, the pine-mouse alone showing anything in the way of decided color—a warm chestnut. Their bodies are heavy, heads large, noses bluntly rounded, eyes and ears small, and feet and tail short—the latter hardly touching the ground. The common species is five and one-half inches long, including the tail (one and one-quarter inches), and the pine-mouse is four and three-quarter inches in total length. They are, indeed, like diminutive muskrats, and it is not surprising to find their favorite haunts to be swampy places and lowlands bordering streams.

Closely related to these, but more creatures of the forest, are the red-backed mice (*Evotomys gapperi*) of the northern tier of the States and Canada. Its form and size are those of the meadow vole, but the back is distinctly chestnut red and the sides are yellowish, while the ears and whiskers are much longer. Its *habitat* is among

forest trees, where it dwells in and about old stumps and hollow trees, and does not fear to go about by daylight. In the Alleghanies it extends along the ridges southward through Pennsylvania, and it also dwells in the swamps and hemlock woods of the Catskills and the Hudson Highlands.

Far more active and pleasing than these voles are the deer-mice (*Peromyscus*) frequenting the woods of the East and prairies of the West, where the soil is dry. The rice-field mouse of the South and two or three species of the Middle West belong in this genus, but the most familiar one is the widely distributed and everywhere plentiful white-footed deer-mouse (*Peromyscus americanus*), which we used to call *Hesperomys leucopus*.

This white-foot is somewhat larger than a house-mouse, measuring about three and one-quarter inches from the tip of the nose to the root of the tail, and the tail itself, which is thinly haired, black on top and ashy white beneath, is almost or quite as long as the body. The hind-feet measure three-quarters of an inch in length, but the fore-feet are not half so large.

This mouse has a lithe, slender form and quick movement, and is an agile climber. Its eyes are large and prominent, its nose sharp, and ears high,

round, and thin, giving a most alert expression to its countenance. The fur is soft, dense, and glossy, reddish-brown above and white below, sharply demarcated, while the feet are all white, so that its name of "deer-mouse," in allusion to both colors and speed, is very apt. The half-grown young, however, are mainly bluish-gray, and may easily be mistaken for house-mice.

In general habits all these are pretty much alike, though some prefer dry, while others choose wet, ground; some keep chiefly in the woods, others on the prairies, and so on. All the species burrow more or less, and some build elaborate nests. Their voices are fine, low, and squeaking, but the meadow-mouse is a great chatterbox, and the white-foot has been known more than once really to sing tunes of his own very nicely.* Each one manifests immense courage in defending its young against harm; but I believe only the meadow-mice are accused of being really ferocious, and

* Whether or not this "singing" of mice, which has been observed in several species, including the house-mouse, is not really a kind of wheezing due to bronchial disease, is not yet decided. Any one who cares to look up the question should read the extensive accounts of such musical mice published in *The American Naturalist* for 1871, and also for 1889, p. 481.

of waging battles constantly among themselves. Their food is the tender stems of young grasses and herbs, seeds, nuts, roots, and bark, and they lay up stores of food for the winter, since none become torpid at that season except the jumping-mouse. They also eat insects and worms, particularly such kinds as are hatched under ground or in the loose wood of rotten stumps; but their main subsistence is vegetal.

The field-mice make snug beds in old stumps, under logs, inside stacks of corn and bundles of straw; dig out galleries below the grass-roots; occupy nests of birds and the holes made by other mammals; and even weave nests of their own in weeds and bushes. Crevices of broken rocks are a favorite resort of the jumping-mouse.

This species is, perhaps, the most active of them all; and is found in a greater variety of situations, for it is equally fond of the fields and of the forest, where it creeps about in the dusk, or, if alarmed, bounds away with almost incredible agility. Its long and muscular hind-legs lift its body like powerful springs, and it will make leap after leap with a speed the eye can hardly follow. At first these jumps will be ten feet—some forty times its own length!—but if no covert enables it to stop and con-

ceal itself, as it is clever in doing, this amazing series of flights is gradually reduced to a bounding gallop. Moreover, it can dodge and double with a quickness which eludes the eye and must often baffle even the agility of a hawk or weasel.

This is the only one of our mice to hibernate. As cold weather approaches he digs his way several inches under ground, or finds some equally snug cranny, where he provides himself with warm blankets of shredded bark, fine grass, or the like, wraps his long tail tightly about him, and becomes dead to all outward things until the warmth of spring revives him. This is certainly an easy and economical way to get through the cold season when we remember the hard task set the other species to provide extensive stores for winter consumption.

The most numerous and ubiquitous of all our field-mice, probably, are the meadow-mice, voles, or arvicolines, especially *Microtus pennsylvanicus.* In summer these little creatures inhabit meadows and the weedy edges of fields, where they may be near their food, which consists mainly of green herbage and roots. An immense amount of timothy grass is annually destroyed by their eating the roots and young shoots.

These mice are extremely abundant on the Illinois prairies, especially in those places that are wet and low; and Kennicott gave an excellent account many years ago of their habits there. When the heavy rains of autumn drive them out, they move to higher and drier ground, and look for some hillock, or old ant-hill, under which to dig their home. In digging they scratch rapidly with the fore-feet a few times, and then throw back the earth to a great distance with the hind-feet, frequently loosening the dirt with their teeth, and pushing it aside with their noses. As the hole grows deeper (horizontally) they will lie on their backs and dig overhead, every little while backing slowly out and shoving the loose earth to the entrance. These winter burrows are only five or six inches below the surface, and sometimes are simply hollowed out under a great stone, but are remarkable for the numerous and complicated chambers and side passages of which they are composed. In one of the largest rooms of this subterranean house is placed their winter bed, formed of fine, dry grasses. Its shape and size are about that of a football, with only a small cavity in the centre, entered through a hole in the side, and they creep in as do Arctic travellers into their fur-bags.

"Thou saw the fields laid bare an' waste,
An' weary winter comin' fast,
An', cosey here, beneath the blast
Thou thought to dwell."

From their tunnels, nests, and granaries, innumerable runways traverse the neighborhood, crossing those from other burrows, and forming a complete net-work all over the region. The mice do not flock together like the prairie-dogs, yet, where food is plenty, many nests will often be found closely adjacent. They are sociable little folk, and no doubt enjoy visiting and gossiping with one another. The little paths are their roadways from one burrow to another, and from the place where the tenderest grasses grow to their storehouses. These tiny roads are formed by gnawing clean away the grass stubble, and treading the earth down smooth; while the heads of the grasses arching over on each side conceal the scampering travellers from the prying eyes of hawks, owls, and butcher-birds, ever on the watch for them. The mice seem fully to understand their danger, cautiously going under a tuft of grass or large leaf instead of over it, and avoiding bare places. Moreover, they choose the twilight hours for their excursions rather than the glare of broad daylight

or the blackness of midnight. In winter their paths are tunnelled under the snow, so that they are out of sight; and they always have several means of escape from their burrows, for, as the old song says,

> "The mouse that always trusts to one poor hole,
> Can never be a mouse of any soul."

The Western meadow-mice seem always to lay by considerable stores of winter food. Kennicott says that if you were to uncover one of these little granaries in November, before the owners have made much use of it, you might find five or six quarts of seeds, roots, and small nuts. Out on the prairie this store would consist chiefly of the spike-flower and various other bulbous roots. If a patch of wheat or rye were near, there would be quantities of grain; and if you should open a store (as of the red-backed mouse) under a log or stump in the woods, you might discover a hundred or so chestnuts, beech-nuts, and acorns, nicely shelled. Nevertheless, these mice are out a good deal even in the coldest months, travelling about beneath the snow by means of tunnels, and feeding largely throughout the winter on bark, whereby great damage is sometimes done, especially in nurseries.

Their habits seem somewhat different in the East, where they appear to lay up less stores, and to depend more upon winter foraging; nor do they live at that season in burrows, according to Merriam's careful observations in northern New York.

In summer, he says, the *Microtus* feeds mainly upon the roots of grasses, and dwells in burrows in the meadows, which are cut up by its deeply worn runways, which it rarely leaves, even to mount a log.

"In the beginning of winter, when the ground is frozen for some distance below the surface, it abandons its burrows and lives entirely above ground. Its nests of dry grass then lie flat upon the surface, without attempt at concealment, and are soon buried in the snow. As winter advances and the snow becomes deeper, the meadow-mice regularly betake themselves to their nests for rest. The heat from their bodies soon melts the snow in contact with and immediately adjoining their nests, ... which come to be surrounded by slowly growing, dome-shaped chambers. These increase in size until the spring thaws, in March and April, melt away their roofs, thus admitting light and cold. They are then deserted. . . . From the

bottom of each chamber numerous runways penetrated the snow in all directions."

It is by means of these tunnels that they reach the trunks of small trees to feed upon the bark, which constitutes a large part of their winter food, and thus vast damage is sometimes done to young orchards; and they are fond of taking up their quarters under shocks of grain or corn left standing in the fields, of which they devour enormous quantities. When a well-settled, but carelessly farmed region offers them such opportunities, it is not surprising that they do not find it necessary to lay up large stores.

Our field-mice eat a good many worms and insects, and will even spring into the air and catch flies, but none of them seem to have the habit of the British voles of raiding the nests of bumblebees to get the comb and honey, which gave occasion for that famous illustration of the processes of natural selection in which the intimate connection is shown between the clover crop of a district and the relative number of maiden ladies who inhabit it!

The deer-mice (*Peromyscus*) do not dig much, but prefer to make their homes above ground after the manner of squirrels. In prairie regions, to be

sure, they make burrows for lack of other suitable retreats; but where they dwell, as is more usual, in woodland, they seek hollows in stumps and trees, sometimes many feet above the ground (for they are most excellent climbers), and there construct warm nests of various soft materials.

One of their favorite methods is to take possession of a deep old bird's-nest, such as those of the red-winged blackbird, wood-thrush, or red-eyed vireo, and fill it with their own furniture. I find a pretty example described in one of the essays of the Rev. Dallas Love Sharp, who found a mouse inhabiting a refurnished wood-thrush's nest in snowy Massachusetts:

"In spite of the exposure," he says, "this must be a warm bed. The walls are thick and well plastered with mud, and are packed inside with fine, shredded bark which the mouse himself has pulled from the dead chestnut limbs, or, more likely, has taken from a deserted crow's nest. The whole is thatched with a roof of shredded bark, so neatly laid that it sheds the water perfectly. The entrance is on the side, just over the edge of the original structure, but so shielded by the extended roof that the rain and snow never beat in. The thrushes did their work well; the nest is se-

curely mortised into the forking branches; and whitefoot can sleep without a tremor through the wildest winter gale."

Not long ago I received a pleasant letter from Mr. John Burroughs, in which he said: "The other day I found the nest of the white-footed mouse. Going through the woods, I paused by a red cedar, the top of which had been broken off and lopped over till it touched the ground. It was dry, and formed a very dense mass. I touched a match to it to see it burn, when, just as the flames were creeping up into it, out jumped or tumbled two white-footed mice, and made off in opposite directions. I was just in time to see the nest before the flames caught it—a mass of fine, dry grass, about five feet from the ground, in the thickest part of the cedar top." This was in the Catskills.

In such nests litters of from two to four young are born early in the spring, and perhaps two more are produced before the coming of the next winter, for, like all the rest, this species is exceedingly prolific. The mothers are tenderly careful of their little ones and courageous in their defence. Often when a nest is disturbed you will see the mother struggling to get away by dragging three or four

young ones hanging to her body. Once when we went to open our summer cabin, in the woods, in May, we found a family of white-footed mice ensconced between the folds of some blankets, whence a great quantity of wool had been plucked to form a nest. We took a double handful of this wool, containing four gray mouslings, and placed it in an empty water-pail on the porch. The mother watched us, followed after, and then climbed into the bucket and carried off her darlings to a new hiding-place, regardless of our presence.

A gentleman in Illinois once saw a garter-snake pass rapidly by with a young meadow-mouse in its mouth. Presently an old meadow-mouse came out of the tall grass in pursuit of the snake, which she finally overtook and instantly attacked. The snake stopped, disgorged its prey, and defended itself by striking at its assailant, which stood its ground so firmly that the man was able to approach to kill both before his presence was noticed by the duellists.

This white-footed mouse constantly comes into houses near woods, yet it does not seem anywhere to become domesticated, like the house-mouse, but only to be a casual guest from time to time. Thoreau tells pleasantly how he had such visitors

when he lived all alone in the woods by Walden Pond, near Concord, Massachusetts:

"The mice which haunted my house were not the common ones, which are said to have been introduced into the country, but a wild, native kind not found in the village. I sent one to a distinguished naturalist, and it interested him much. When I was building, one of these had its nest underneath the house, and, before I had laid the second floor and swept out the shavings, would come out regularly at lunch-time and pick up the crumbs at my feet. It probably had never seen a man before; and it soon became quite familiar, and would run over my shoes and up my clothes. It could readily ascend the sides of the room by short impulses, like a squirrel, which it resembled in its motions. At length, as I leaned my elbow on the bench one day, it ran up my clothes and along my sleeve, and around and around the table which held my dinner, while I kept the latter close, and dodged and played at bo-peep with it; and when at last I held still a piece of cheese between my thumb and finger, it came and nibbled it, sitting in my hand, and afterwards cleaned its face and paws like a fly and walked away."

Mice are full of such curiosity. They poke

their noses into all sorts of places where there is a prospect of something to eat, and sometimes, failing to find so good a friend as Mr. Thoreau, meet the fate which ought to be the end of all poking of noses into other people's affairs.

But the life of a field-mouse is not all frisking about under the fragrant flowers, or digging channels through shining sand and crystal snow. He has his labor and trials and trouble like the rest of us. If a "man must be either a man or a mouse," it would be hard choosing between them, so far as an easy time is concerned. The gathering of his food and the building of his house cost him "mony a weary nibble," and he must constantly be on the alert, for dangers haunt him on every side. One of his enemies is the snake, all the larger sorts of which pounce upon him in the grass, lie in wait for him in his highway, or steal into his burrow and seize his helpless young, in spite of the frantic fighting of the father and the stout attempts of the mother to drag her little ones away into safety.

Probably our snakes depend more upon catching mice than upon any other resource for their daily food, and they hunt for them incessantly. Most of the mice have the bad habit of being abroad mainly at night; so have the snakes; and the mice

thus encounter more foes, and fall an easier prey, than if they deferred their ramblings until daylight. Being out nights is a bad practice! The prairie rattlesnakes are especially fond of mice; minks, weasels, skunks, and badgers eat as many as they can catch, and this probably is not a few; domestic cats hunt them eagerly, seeming to prefer them to house-mice—no doubt they are more sweet and delicate; foxes also enjoy them; dogs and wolves dig them out of their burrows and devour them; prairie fires burn multitudes of them, and farmer boys trap them. But, after all, perhaps their chief foes are the flesh-eating birds.

We have in this country two black, white, and gray birds called shrikes, or butcher-birds, which are only about the size of robins, but are very strong, brave, and noble in appearance. These shrikes have the curious habit of killing more game than they need, and hanging it up on thorns, or lodging it in a crack in the fence or the crotch of a tree. They seem to hunt just for the fun of it, and kill for the sake of killing. Now their chief game is the unhappy field-mouse; and in Illinois they are known as "mouse-birds." They never seem to eat much of the flesh of their victims, generally only pecking their brains out, but murder an enor-

A Garter Snake

mous number, and keep up the slaughter through the whole year; for when the loggerhead-shrike retreats southward in the autumn, the great Northern shrike comes from British America to supply his place through the winter. Then all the hawks, from the nimble little sharp-shinned to the great swooping buzzard, prey upon mice, and in winter hover day after day over the knolls where they have been driven by floods in the surrounding lowlands, pouncing upon every one that is imprudent enough to show his black eyes above ground. As for the marsh-hawk, it regularly quarters the low fields like a harrier, and eats little but mice. The owls, too, are constantly after them, hunting them day and night, on the prairies and in the woods, esteeming them fine food for the four owlets in the hollow tree hard by; while the sand-hill crane and some of the herons make a regular business of seeking the underground homes and digging out the timorous fugitives with their pick-axe beaks. In addition to all the rest, the farmer everywhere persecutes the mouse as a pest to his orchards and crops.

Has the poor little animal, then, no friends whatever? Very few, except his own endurance and cunning; yet he is already so numerous, and in-

creases so rapidly, that all his enemies have not been able to rid the earth of him, but only keep him in check, and thus preserve that nice balance of nature in which consists the welfare of all.

An important part of the history of these pretty wild mice would be untold if I were to say nothing about the mischief they do to the farmer's fields and fruit-trees. From what has been said of their underground stores, you may guess how they make the grain-fields suffer. They really spoil more grain than they consume, for they have a way of biting off the stalk to get at the head, and so waste a larger amount than they eat or carry off in their capacious cheeks. It is done so quietly and adroitly, too, that few are ever caught at it, and much of the blame is put on the moles, squirrels, and woodchucks, that have enough sins of their own to answer for. The meadow-mouse of Europe, which is very like our own, forty or fifty years ago came near causing a famine in parts of England, ruining the crops before they could get fairly started, and killing almost all the young trees in the orchards and woods. More than thirty thousand of the little rascals were trapped in one month in a single piece of forest, besides all those killed by animals. About 1875, again, a similar

disaster was threatened in Scotland, where millions of mice appeared, and gnawed off the young grass at the root just when it should have been in prime condition for the sheep; and when that was all gone they attacked the garden vegetables. The people lost vast numbers of sheep and lambs from starvation, and thousands of dollars' worth of growing food; but, finally, by all together waging war upon them, the pests were partially killed off. The mice did not in either case come suddenly, but had been increasing steadily for years previous, because the game-keepers had killed so many of the "vermin" (as owls, hawks, weasels, snakes, etc., are wrongly called) which are the natural enemies of the mice and keep their numbers down.

Farmers are slow to learn that it doesn't pay to kill the birds or rob their nests; but the boys and girls ought to understand this truth and remember it.

In this country the greatest mischief done by the field-mice is the gnawing of bark from the fruit-trees, so that in some of the Western States this is the most serious difficulty the orchardist has to contend with. Whole rows of young trees in nurseries are stripped of their bark, and of course die; and, where apple-seeds are planted, the mice are

sure to dig half of them up to eat the kernels. This mischief is mainly done in the winter, when the trees are packed away from the frost; or if they are growing, because then the mice can move about concealed under the snow, and nibble all the bark away up to the surface. Rabbits get much of the credit of this naughty work, for they do a good deal of it on their own account. The gardener has the same trouble, often finding, when he uncovers a rare and costly plant in the spring, that the mice have enjoyed good winter-quarters in his straw covering, and have been gnawing to death his choice roses. Millions of dollars, perhaps, would not pay for all the damage these small creatures thus accomplish each year in the United States, and I fear they will become more and more of a plague if we continue to kill off the harmless hawks, owls, butcher-birds, and snakes, which are the policemen appointed by Nature to look after the mice and protect us against them.

In captivity the wild mice, especially the white-footed deer-mouse, make very pretty pets; and one can easily study all their ways by giving them earth in which to burrow and the various sorts of food in which they delight.

XI

FLYING SQUIRRELS

WOULD it be far wrong to call the flying-squirrel the most beautiful, the most lovable of American mammals? None other seems so attractive to both the eye and the imagination, and this impression is confirmed when we come to know the little creature as a pet, for its gentleness and caressing trust in us are wholly charming.

Flying-squirrels are to be found all over the country, braving even a Canadian winter, yet are not commonly seen, for no animal is more strictly

nocturnal among the many which go abroad after dark. He who quietly wanders through our groves and forests during the warm, still nights of summer, remarks an observer of these things, marks a myriad of sounds that betoken the presence and activity of animal life during the hours of darkness. The faint rustling of leaves, the pattering of light footsteps on the ground, the constant dropping of something from the trees, the sharp squeaking of unseen creatures, the lonesome note of a wakeful bird, "the bustle and chipper of something chasing something else up the trunk of a neighboring tree, the cry of distress as some bird or beast of prey seizes its unhappy victim"—these and numberless other noises tell of life, active and abounding. To this confusing chorus of the night the flying-squirrels contribute not a little, for from twilight until dawn they are abroad, hunting and hunted, working and playing, their big, black eyes expanded to catch whatever thin rays of light illumine the leafy recesses. Quietly watching in some moonlit glade, you may perhaps see their singular and graceful movements.

In these glidings they cannot change their direction to any extent, nor acquire a new impulse, nor go beyond their power to sail down an inclined

A Flying Squirrel

plane upon the parachute formed by the loose skin of their sides, which reaches to the feet and is extended by their outstretched legs.

Some hollow of an old tree-trunk gives them a home—preferably the snug chamber cut years before by a woodpecker; but sometimes they choose a cranny among rocks, or, more often nowadays, take possession of a garden bird-box or a nook beneath the eaves or inside the garret of a house. They will, indeed, make themselves exceedingly at home anywhere about the premises when encouraged, a privilege careful housekeepers are chary of granting after a little experience of the mischief their inquisitive teeth may do to furniture, upholstery, and hangings, not to speak of the cheerful racket they keep up when a lot of them become colonized in the attic and walls, just at the time when other folks like to have the house quiet. They *do* drive away all the mice, however.

Flying-squirrels feed mainly on thin-shelled nuts, acorns, seeds, and small fruits, such as they can gather without leaving the tree-tops, and seem to drop about three for every one they secure. Insects attract them, and, sad to say, they also eat the eggs and young of birds, for they have a liking for meat, and often plague fur-trappers by devour-

ing their baits, while tame ones consume greedily any raw flesh offered them. Nuts, acorns, and corn grains they store in large quantities in hollows near their winter-quarters, where sometimes a dozen dwell in one hole; and they draw rations from these larders pretty regularly through the winter, except in storms and very "cold snaps," when they remain in-doors, curled up and crowded together, sluggish with sleep, until the weather moderates.

If you want a pet flying-squirrel, it is well to get it when young, as you can usually do in May or June; but an adult will respond to gentle treatment with ready docility, never biting, and becoming in a day or two perfectly tame. If you do not know where a family is living, go about tapping on the woodpecker-riddled dead stubs at the edge of the woods until a furry head pops out to investigate, and then the capture is very easy, for it cannot be denied that this little animal seems to be fearless and confiding largely through lack of wits. And sometimes they make a summer nest of leaves, and carry the youngsters to it to grow up in cooler quarters.

They are, indeed, exceedingly fond and careful of their little ones. Audubon relates that once he

brought home a flying-squirrel family, and, having no cage handy, put them into a bureau-drawer for the night. In the morning the old one was gone, and the kindly naturalist was left to nurse the kittens as best he could. They lived and seemed to thrive, although surprisingly little of the milk he gave them was consumed; but the mystery was presently solved. "A few evenings afterwards," he says, "we were surprised and delighted to see the mother glide through the open window and enter the still open drawer; in a moment she was nestled with her young. She had not forsaken them, but visited them nightly."

Nothing can be prettier as pets, when restrained from becoming a nuisance by multiplication and mischief. All day they remain quiet and usually sleep—in your pocket, if you are willing. It is amusing to watch one preparing for a doze by placing its head between its fore-feet, and then deliberately kneeling over until its head is back between its thighs and its limbs are enwrapped in cloak and tail, so that it is nothing but a soft, round ball of mouse-colored and creamy fur. When dusk falls, however, it wakes up, and all the evening is exceedingly active and playful. Dr. Merriam tells of one which, when placed upon a table,

would come to the edge nearest him and cry to be taken up. "If I extended my arm and approached it, the little creature, trembling with delight, would stand on its hind-legs and leap upon my hand, thence running either up my sleeve or down my neck."

Every one who has kept these squirrels has a similar story to tell; and an escape from the cage at night is always known, for they will go straight to where their master is sleeping and crawl into bed with him, to cuddle as close to his body as they can.

The common flying-squirrel of the eastern United States is about ten inches in total length, Canadian specimens running somewhat larger. The color is yellowish brown above and creamy white below; but Northern specimens are likely to be gray and "cold" in tone as compared with the brighter colors of Southern examples. "Its eyes are unusually large and prominent and perfectly black, and its fur is of much the same quality as chinchilla, and of even softer tints. The flying membrane consists of a thin strip of skin stretched between the fore and hind legs and furred above and below. A slight cartilaginous support runs back from the wrist, assisting to extend the mem-

brane when the fore-legs are spread apart as in flying. The tail probably serves both as parachute and rudder, since it is thin and flat, but of such a close, silky texture as to catch the wind like a sail."

"I should imagine," says Mr. William E. Cram, from whose excellent writings I have quoted the paragraph preceding this, "that from their nocturnal habits these squirrels would fall frequent victims to the different kinds of owls, although I cannot recall ever having found any evidence of this having been the case, either about the nests or in the stomachs of such owls as I have examined. But in all probability they are frequently snapped up by them, as well as by foxes, weasels, and the like, just as they are occasionally by domestic cats."

XII

CIVILIZING INFLUENCES

TO say that the settlement of North America has produced a marked effect upon the animal life of the continent, and upon the birds as a part of the fauna, may seem too much of a truism to be worth discussion. Yet the degree to which this effect has been felt, and the various ways in which man's influence has been exerted upon animals, may still be objects of interesting inquiry. I confine myself alone to the effects produced by the white man, because the Indian seems to have caused hardly an appreciable change, either for

good or evil, in the comparative plenitude, or in the habits, of the creatures dwelling about him. He himself was really as wild and indigenous as they, hunting, like the carnivores, purely for food, and, with the osprey, fishing only when his wants were urgent; his mind was too grim to entertain the idea of pursuing animals for sport, and his civilization too limited to cause much disturbance of natural conditions.

During the last two and a half centuries white men have spread everywhere, and in almost every part of the continent their machinery has replaced the original simplicity of nature. Thousands of square miles of forest have been cleared, marshes have been drained, rivers obstructed and tormented with mill-wheels, and cities have sprung up as swiftly as the second growth of scrub pines follows the levelling of an oak wood.

The inevitable result must follow that all our animals, birds included, would have been so harassed by their changed surroundings and the persecutions of human foes that they would have rapidly disappeared. With the vast majority of the quadrupeds this has actually been the case. "Wild beasts" no longer haunt our forests, to the terror of the traveller; nor can the hunter now find game

that a few decades ago was abundant almost at his door. It has been much the same with wild fowl and game birds. They have deserted their ancient nesting-places within our borders for the safer arctic heaths, or old and young have been all but exterminated by gun and snare. Nevertheless, a large number of the smaller birds of our woodlands and prairies, as I hope to show, have been decidedly benefited by the advent of white men.

It is commonly observed that scarcely any small birds are seen in the depths of a forest, but they become abundant as one approaches the neighborhood of settlements. Travellers through Siberia know that they are coming near a village when they begin to hear the voices of birds, which are absent from the intervening solitudes. Every ornithologist has proved these facts in his own experience, and explorers who go to uninhabited and primeval regions have learned not to expect there the chorus that greets their ears from the great army of songsters thronging the fields in populous countries.

The song birds—the small denizens of our summer groves, pastures, and meadows—seem, then, to recognize the presence of man's civilization as a blessing, and have taken advantage of it, both

from love of human society and for more solid and prosaic reasons.

The settlement of a country implies the felling of forests, the letting in upon the ground of light and warmth, the propagation of seed-bearing cereals, weeds, and grasses enormously in excess of a natural state of things, the destruction of noxious quadrupeds and reptiles, and the introduction of horses and cattle. Each of these alterations of nature (except in some few cases, like that of the relation of the woodpecker to the cutting away of timber) is a direct benefit to the little birds. It is not difficult to demonstrate this.

Birds naturally choose sunny spots in which to build their nests, such as some little glade on the bank of a stream; when roads were cut and fields levelled in the midst of sombre woods, the area suitable for nesting was, of course, greatly added to, and a better chance thus afforded for successfully hatching and rearing broods of young. The way in which the wood-roads cut by the hemlock bark-peelers through the dense forests that clothe the remote Catskills have become the haunt of birds and insects is a capital example in urging this point. One of the largest avine families—that of the sparrows, finches, and buntings—subsists

almost exclusively on seeds of weeds and grasses; and the members of a large proportion of other families depend somewhat for their daily supply on this sort of food. Under the universal shade of trees weeds can grow only sparingly, and on prairies the crop is often killed by drought or is burned in the autumn; but the cultivation of immense fields of grain and hay, and the making of broad pastures and half-worn roads, which almost immediately become filled with weeds, have furnished the birds with an inexhaustible and unfailing harvest.

Birds suffer much harm from many quadrupeds —foxes, weasels, skunks, rats, etc.—which catch them on their roosts, suck their eggs, and kill their fledglings. Snakes also are fond of them, and destroy many nests every season—in early summer subsisting almost alone on eggs. All these animals, particularly foxes, skunks, and serpents, are greatly reduced in number by settlements, although it must be confessed that their absence is somewhat compensated for by the introduction of domestic cats, which go foraging through the woods, to the grief of all their feathered inhabitants. No longer in fear of their natural enemies, and learning that there is little reason to be apprehensive

of harm from mankind, the small birds forsake their silent, shy manners, come out of the thickets where they have been hiding, and let their voices be heard in ringing tones, easily interpreted as rejoicing at deliverance from fear and thanksgiving for liberty to sing as loud as pleases them.

All small birds are more or less completely insectivorous (even the cone-billed seed-eaters having to feed their young with larvæ at first), and naturally congregate where this food is most abundantly supplied. There would seem to be enough anywhere; but the ploughing and manuring of the soil facilitates the growth and increase of such insects as go through their metamorphoses in the ground; and the culture of orchards furnishes an excellent resort for many boring and fruit-loving moths, beetles, and the like, which find the best possible circumstances for their multiplication in the diseased trunks and juicy fruit of the apple, plum, cherry, and peach. No part of the farm has so many winged citizens as the orchard.

The presence of horses, cattle, and sheep offers to flies and other insect tribes excellent opportunities for the safe rearing of their eggs in the dunghills and heaps of wet straw always lying about barns, and attracts a great colony of those

minute beetles upon which the fly-catching birds principally maintain themselves. The cattle-yard, therefore, forms a sort of game preserve for such birds, and many species flock thither. Swallows are hardly ever found except in the vicinity of barns; the cow-bunting receives its name from its habit of constantly associating with cattle; and the king-bird finds the stable-yard his most profitable hunting-ground. Near the habitations of men, small birds also enjoy protection from hawks and owls, which hesitate to venture away from the shelter of the woods, and whose numbers are reduced, unwisely perhaps, by incessant persecution.*

The logic of the case is simple: birds will assemble chiefly where food for themselves and their young is in greatest abundance, and where they are least exposed to enemies. These two prime conditions of prosperity, with many favorable concomitants, man's art supplies to the insessorial birds, which, on the other hand, suffer little direct injury from his contact. Yet some species seem

* In several States of the Union bounties are offered, sometimes by county authorities, sometimes by game-protective associations, and hundreds of hawks and owls are killed annually.

little affected by the civilizing of the country, either in numbers or habits, while others increase rapidly on the first settlement of a region, and then decrease again. Of this class are the prairie-hen and other game, and the mallard. "They find abundance of food in the corn and wheat fields; while the population is sparse and larger game so abundant, they are hunted very little; but as the population increases they are gradually thinned out, and become in some cases exterminated. Other birds, as the quail, are wholly unknown beyond the frontier, and only appear after the country has been settled a short time. Still others, woodland species, appear in regions where they were never known before, as groves of trees are planted, and thick woods spring up on the prairies as soon as the ravages of the fires are checked."

Striking examples of how some of our birds have accepted this tacit invitation to make men their confidants occur in the history of the American swallows and swifts. Our purple martins spread themselves in summer all over North America, but are becoming rare in the New England States, whence they seem to have been driven by the white-bellied swallows, which have gradually grown more numerous, and which, preceding the

martins in the spring, take possession of all the boxes put up for the accommodation of the martins, and exclude the rightful tenants *vi et armis*. Their natural nesting-places were hollow trees and cavities in rocks; but now, throughout the whole breadth of the land, it is rare to find martins resorting to such quarters, except in the most remote parts of the Rocky Mountains. They have everywhere abandoned the woods, and come into the villages, towns, and even cities, choosing to nest in communities about the eaves of houses and barns, and in sheltered portions of piazzas, or to take possession of garden bird-boxes, where their social, confiding dispositions have rendered them general favorites.

A very similar case is presented in the case of our chimney-swift, which finds a chimney a far more desirable residence than a hollow tree in the woods. Latterly, indeed, this bird has gone further, for in such old-settled regions as the maritime provinces of Canada it is constantly forsaking chimneys and placing its nest in sheds and attics, where there is light and air and safer and more cleanly surroundings. This shows, among other things, great confidence in its human friends.

Other species of American swallows afford still

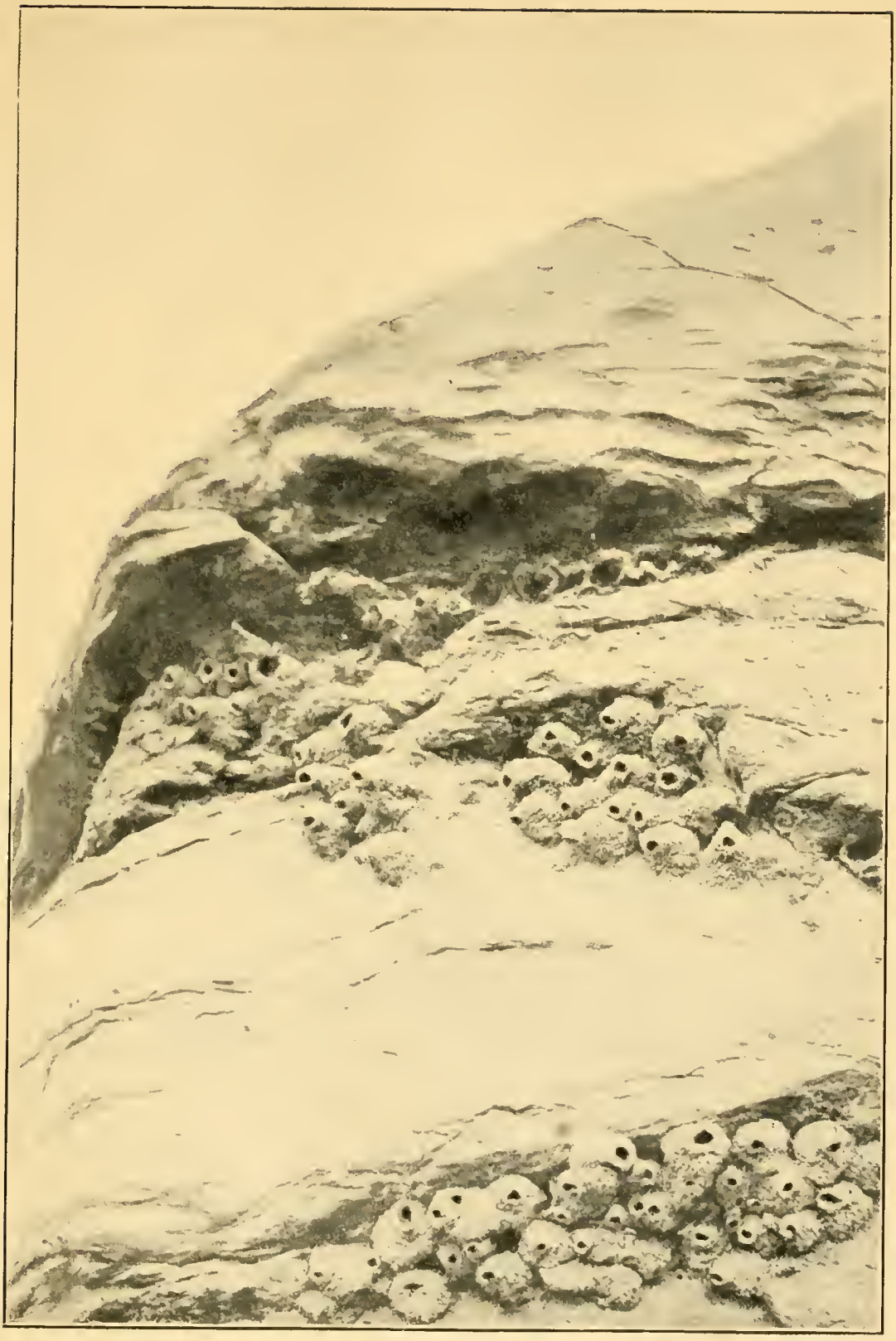
more striking illustrations of a change in the manner of life effected by association with men. Perhaps the most curious example is the case of the eave-swallow (*Petrochelidon lunifrons*). This bird remained undiscovered until 1820, when it was met with by the celebrated Thomas Say when naturalist to Major Long's expedition to the Rocky Mountains, a memento of which remains in the name of one of the loftiest heights of the snowy range—Long's Peak. In 1825, however, the bird suddenly appeared at Fort Chippewa, in the fur country, and contentedly built its nest under the caves. Even earlier it had been seen on the Ohio River, at Whitehall, New York, and very soon after was found breeding in the Green Mountains, in Maine, in New Brunswick, and among the high limestone cliffs of the islands along that precipitous coast. It occurs also westward to the Pacific coast. It is hardly to be supposed that these swallows were indigenous to some restricted locality in the West, whence they suddenly made such a startling exodus; but rather it is believed that they always had existed in isolated spots all over the country, but so far apart and so uncommonly that they were overlooked.

The experience of the barn-swallow (*Chelidon*

erythrogaster) has been much the same; and the Rocky Mountain swallow (*Tachycineta thalassina*), which breeds in far-separated colonies throughout the mountainous West, is fast following its example in scraping acquaintance with mankind.

The natural breeding-place of all the three species I have mentioned is in caves and crevices of rock, the irregularities and hollows of limestone crags affording them the best chances. "Swallows' Cave," at Nahant, is remembered as one of their hospices. I have seen all three species breeding together among the ragged ledges of Middle Park, Colorado; but considerable differences were noticeable between the houses of these uncivilized builders and those of their educated brethren at the East, who now, perhaps, would find it rather hard to rough it as did their ancestors.

Under the shelter of warm barns, and with such an abundance of food at hand that they have plenty of leisure between meals to cultivate their tastes and give scope to their ingenuity, our barn and eave swallows have shown a wondrous improvement in architecture. The nests of the barn-swallows that I saw at the hot sulphur springs in Colorado consisted only of a loose bed of straw and feathers, for the hollow floors of the niches in which



Nests of the Wild Cliff-swallow

they were placed formed cavity and barrier for the safety of the eggs. Some nests, resting on more exposed ledges, had a rude foundation and rim of mud, but did not compare with the elaborate half-bowls, lined with hay and feathers, that are plastered by the same species so firmly against the rafters of our barns, or with the large nest that is balanced on the beam, with its edges built up so high that the callow young can hardly climb, much less tumble, out until quite ready to fly. Nevertheless, the general character of the nest is the same; the Eastern, civilized swallows have only made use of their superior advantages to perfect the inherited idea. In the case of the barn-swallow, its civilization results in an addition to its pains (is it not a natural consequence?), in that its nest now is required to be much larger, more carefully, and hence more laboriously, made. On the other hand, its neighbor, the eave-swallow, has contrived to save itself labor by the change from wild life.

This latter species is sometimes called the republican swallow, because at the breeding-season it gathers in extensive colonies, where its homes are crowded together as closely as the cells in a honey-comb, one wall often serving for two

or more contiguous structures. The nests are gourd-shaped, or like a chemist's retort, and are fastened by the bulb to the cliff, generally where it overhangs, with the curving necks opening outward and affording an entrance just large enough to admit the owner. This retort is constructed of pellets of mud, well compacted in the little mason's beak, and made adhesive by mixture with the gluelike saliva with which all swallows are provided. In this snug receptacle the pretty eggs are laid upon a bed of soft straw and feathers. Such was the elaborate structure deemed necessary by the swallows so long as they nested in exposed places, where they had to guard against the weather and crafty enemies. "But since these birds have placed themselves under the protection of man, they have found that there is no longer any need of all this superfluous architecture, and the shape of their nests has been gradually simplified and improved. In 1857, on one of the islands in the Bay of Fundy, Dr. T. M. Brewer met with a large colony whose nests, on the side of the barn, were placed between two projecting boards put up for them by the friendly proprietor. The very first year they occupied these convenient quarters, every one of these sensible swallows built

nests open at the top, discarding the old patriarchal domes and narrow entrances of their forefathers." This is not an isolated case, but one that may frequently be matched wherever there is a roof over them, so far as my own observation goes.

The purple martin and white-bellied swallow both accept of houses ready made, saving themselves all trouble except in furnishing them; and even the burrowing bank and rough-winged swallows are learning that it is cheaper to build in a snug cranny in an old wall than laboriously to dig a deep crypt in a sand-bank wherein to lay their pearly eggs.

Men's industries have supplied the birds with some new and exceedingly useful building materials, such as furnishing those weavers, the orioles and vireos, with strings and yarn for the warp of their fabrications, and the yellow-bird with cotton and wool to make her already downy bed still softer. Instances of abnormally late and early breeding seem to be very common in England, and are coming to be more and more frequently recorded on this side of the Atlantic. This is not to be wondered at, since our operations insure to the birds a continued supply of suitable food, and thus en-

able them to rear their young at seasons when in a wild state it would not be possible to do so. The English sparrows, breeding all the year round, or nearly so, in the parks of our coast cities, are a case in point.

That civilization has to some extent governed the migrations and geographical distribution of many species of our birds not directly warred upon as pot game, for amusement, or because they are obnoxious to crops, could easily be shown had I space at command to bring forward illustrations; and when another two centuries have rolled around the effect will be very striking. The mocking and Bewick's wrens, the rose-breasted grossbeak, chestnut-sided warbler, and other species, have spread northward and become more abundant since the time of Wilson and Audubon; the bobolink has kept pace with the widening cultivation of rice and grain fields; the red-headed woodpecker has retreated from New England; the Arkansas flycatcher has multiplied and spread as a town bird through all the cities and villages from Council Bluffs to Denver; the raven has gradually retired before the wood-cutter, until it has almost ceased to exist; while year by year the crow has extended its range, without seeming in the least to di-

minish its force in the older districts, but crowding the wild and refractory raven farther and farther beyond the western frontier.

Although none have abandoned their old way of life so completely as the swallows, many other birds have profited by the constructions and friendship of the human race. The bluebird and house-wren, chickadees and nuthatches dig holes in the fence-posts conveniently rotting for their use; and even such wild species as the Western fly-catcher, great-crested kingbird, and Bewick's wren occasionally attach themselves to mankind, and hatch their young under his roof for greater security. Even the whippoorwill and nighthawk, asleep all day in the swamp, are glad to come to the farmer's house in the evening, and now and then to deposit their eggs on a flat roof. In the Rocky Mountains I have seen flocks of white ptarmigans nimbly hopping around the door-steps of miners who were seeking silver far above timber-line, picking up the crumbs thrown to them, as tame as pet chickens.

In not a few instances, here as well as abroad, superstition brings profit to our birds. An honest old Pennsylvania Dutchman, around whose barn clouds of swallows hovered, told Wilson that he

must on no account shoot any, for if one was killed his cows would give bloody milk, and that so long as the swallows inhabited the barns his buildings were in no danger of being struck by lightning. The arrival of the fish-hawk or osprey on the New Jersey coast, at the vernal equinox, notes the beginning of the fishing-season. In some parts of New England the appearance of the golden-winged woodpecker means the same thing, for the bird is known as the "shad-spirit." The coming of both is therefore hailed with satisfaction, and it is considered so "lucky" to have an osprey nesting upon one's farm that proprietors cherish its huge house in the lone tree with uncommon care, recalling the reverent fostering that a family of storks will enjoy from the peasant of the Netherlands on whose roof their nest has been placed.

The result of all these circumstances, as it seems to me, is that the aggregate army of singing birds in the United States, east of the Mississippi, has been very considerably enlarged during the last two centuries, and is still on the increase. This can be owing only to the fact that by cutting down the forests, etc., civilized man has multiplied the sources of bird food, has increased the number of places suitable for nesting and rearing the young,

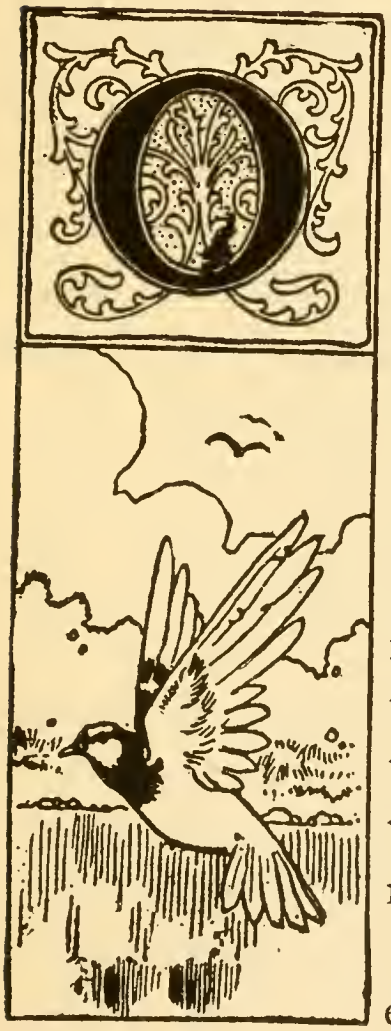
and has enabled more fledglings to be brought to maturity by reducing the ranks of the enemies of the birds. This has not only augmented their number, and very appreciably modified their habits of nesting and migration, but probably has somewhat changed even their physical and mental characteristics. There is little doubt in my mind, for instance, that in making their lives less laborious, apprehensive, and solitary, man has left the birds time and opportunity for far more singing than their hard-worked, scantily fed, and timorous ancestors ever enjoyed — a privilege a bird would not be slow to avail itself of.

Another noticeable effect is also of a mental order. No longer worried, our song-birds have become better minstrels—more copious and more tuneful; and I believe that the delicious prattle of the bluebird; the careless fluting of the oriole, whistling like a boy on his way to the circus; the cheerful roundelay of the thrasher; the more serious melody of wood-thrush and vireo; the gay shouting of flicker and jay—these and other voices of field and grove are far more often heard to-day, and are more musical, than when first they fell upon the ears of the Puritan and trader of the North, or of Cavalier and planter in the South. It is my

opinion that such birds as come familiarly about our gardens have not only increased in numbers since the settlement of the continent, but that they are livelier, more entertaining, and happier than were their untamed ancestors.

XIII

HOW ANIMALS GET HOME



ONE of the most striking powers possessed by animals is that of finding their way home from a great distance, and over a road with which they are supposed to be unacquainted. It has long been a question whether we are to attribute these remarkable performances to a purely intuitive perception by the animal of the direction and the practicable route to his home, or whether they are the results of a conscious study of the situation and a definite carrying-out of well-judged plans.

Probably the most prominent example of this wonderful power

is the case of homing-pigeons. These pigeons are very strong of wing, and their intelligence is cultivated to a high degree; for their peculiar "gift" has been made use of since time immemorial. The principle of heredity, therefore, now acts with much force; nevertheless, each young bird must be subjected to severe training in order to fit it for those arduous competitions which annually take place among first-rate birds. As soon as the fledgling is fairly strong on its wings, it is taken a few miles from the cot and released. It rises into the air, looks about, and starts straightaway for home. There is no mystery about this at all; when it has attained the height of a few yards the bird can see its cot, and full of that strong love of home which is so characteristic of its wild ancestors, the blue-rocks, it hastens back to the society of its mates. The next day the trial distance is doubled, and the third day is still further increased, until in a few weeks it will return from a distance of seventy miles, which is all that a bird-of-the-year is "fit" to do; and when two years old will return from two hundred miles, longer distances being left to more mature birds. But all this training must be in a continuous direction; if the first lesson was towards the east, subsequent lessons must also be; nor can

the added distance each time exceed a certain limit, for then, after trying this way and that, and failing to recognize any landmark, the bird will simply come back to where it was thrown up. Moreover, it must always be clear weather. Homing-pigeons will make no attempt to start in a fog, or if they do get away, a hundred chances to one they will be lost. Nor do they travel at night, but settle down at dusk and renew their journey in the morning. When snow disguises the landscape, also, many pigeons go astray. None of these circumstances seriously hampers the semiannual migrations of swallows or geese. They journey at night, as well as by day, straight over vast bodies of water and flat deserts, true to the north or south. Homing-pigeons fly northward or southward, east or west, equally well, and it is evident that their course is guided only by observation. Watch one tossed. On strong pinions it mounts straight up into the air a hundred feet. Then it begins to sweep around in great circles, rising higher and higher, until—if the locality is seventy-five or one hundred miles beyond where it has ever been before—it will go almost out of sight. Then suddenly you will see it strike off upon a straight course, and that course is homeward. But take

the same bird there a second time and none of these aërial revolutions will occur—its time is too pressing, its homesickness too intense for that; instantly it turns its face towards its owner's dove-cot.

These facts mean something. They show that two definite intellectual processes serve to decide for the bird the direction he is to take—observation and memory. He gets high enough, and turns about times enough, to catch sight of some familiar object, and he makes for it; arrived there, another known feature catches his eye, and thus by ever narrowing stages he is guided home. Few persons have any idea of the distance one can see at great elevations. More than once I have stood on the Rocky Mountains, where, had I been a pigeon, I could have steered my flight by another mountain more than one hundred miles distant. Balloonists say that at the height of half a mile the whole course of the Thames or the Seine, from end to end, is spread out as plain as a map beneath their eyes. There is no doubt that a pigeon may rise to where he can recognize, in clear weather, a landscape one hundred and fifty miles away; it has been done repeatedly, though only by the best birds, specially trained for that particular line of

flight. There is no greater error than to suppose that carrier-pigeons sent a long distance from home in any direction will always return, as though attracted by a load-stone. The benevolent lady received only a good-natured laugh for her pains when she offered to equip one of the British arctic expeditions with these winged messengers, who, she supposed, could be despatched from any point with tidings, and have a fair chance of getting straight back to England.

A pigeon's power of memory is really wonderful. Beginning with short stages, perhaps of not more than a dozen miles, the final stage of a match-flight of five hundred miles will be more than one hundred. The country has been seen but once, yet the bird remembers it, and not only for the three or four days of a match, but for months. In June, 1877, birds trained from Bath to London were twice flown. On June 11th of 1878 they repeated the trip at good speed. Such feats are not uncommon with Belgian birds—the best of all—and there have been several authenticated instances of their going off-handed from England to Belgium after having been kept in confinement many months. But the homing intelligence of pigeons is subject to much irregularity of action, and this

very circumstance insists that it shall not be considered an unvarying, unreasoning instinct.

Enough has now been said, perhaps, to enable one to see that, however much the bird may be aided by an acute sense of direction—a capability, I mean, of preserving a straight course, once ascertained, which sense some may prefer to speak of as an "instinct"—the homing faculty of the homing-pigeon is the result of education, and is not a matter of intuition at all.

The bee pursues a truly similar course. When he is loaded with nectar, you will note him cease humming about the heads of the flowers and spring up in a swift, vertical spiral, and, after circling about a moment, shoot homeward "in a bee-line." Evidently he has "got his bearings." Had you watched him the first time he ever left his hive you would have observed precisely similar conduct to acquaint himself with the surroundings.

How a bird like the albatross, the man-of-war-hawk, or the petrel, swinging on tireless pinions in apparently aimless flight over the tossing and objectless ocean, suddenly rouses its reserve of strength to traverse in a day or two the hundreds of miles between it and the rocky shores where it builds its nest, or how it finds the lone islet which

The Northern Gray Squirrel

these winged wanderers of the sea alone render populous, is not easily explained. Nor can we readily understand how once a year the salmon comes back (from conjecture only guesses where), not to the coast alone, for that would be no more than an ordinary case of migration, but to the identical stream where it was born; and to prove that it was not a blind emotion that led it would be harder than in the case of the pigeon, the bee, or even the frigate-bird. Yet who knows that the fishes may not be able to perceive the differences in the water which we designate "variations of temperature and density," or still more delicate properties, and thus distinguish the fluid of their native place from the outside element? It is a question, however, whether this phenomenon comes properly within the scope of this article.

Many domestic animals show a true homing faculty, and often in a degree which excites our surprise. One of the most remarkable cases I knew was that of two of the mules of a pack-train which, plainly by concerted action, left our camp one morning without cause or provocation. We were in southwestern Wyoming, about seventy-five miles northwest of Rawlins Station, where we

had begun our march. Our course, however, had been an exceedingly roundabout one, including a great deal of very bad country, where no road or trail existed. These mules made no attempt to trace it back, but struck straight across the country. They were chased many miles, and showed not the least hesitancy in choosing their way, keeping straight on across the rolling plain, with a haste which seems not to have diminished until Rawlins was almost reached, when they were caught by some prospectors. For weeks they had to be kept carefully hobbled to prevent a repetition of the experiment.

How did these animals know the direction with such certainty? Mules frequently follow a very obscure trail backward for many miles, and, even more than horses, may be trusted to find the way home in the dark; but this is only when they have been over the road before, and is quite as fully due to their superior eyesight as to their strong sense of locality. I have also seen mules following the trail of a pack-train a few hours in advance, almost wholly by scenting; but the two runaways before mentioned had no other conceivable help in laying their course than some distant mountain-tops north and east of (and hence behind) them,

and to profit by these would have required a sort of mental triangulation.

But the most common instances of homing ability are presented by our domestic pets, which often come back to us when we have parted with them in a way quite unaccountable at first thought. An extremely instructive series of authentic examples of this were published in successive numbers of that excellent London newspaper, *The Field.* The discussion was begun by a somewhat aggressive article by Mr. Tegetmeier, in which he expressed the opinion that most of such stories current were "nonsense," and cordially assigned to the regions of the fabulous those narratives which seemed to attribute this power to a special faculty possessed by the animal, instancing himself two cases where a dog and a cat found their way home, as he very justly supposes, by using their memories. The distance was not great; they obtained a knowledge of the routes, and took their departure. "Very interesting," replied a correspondent, "but no argument against another cat or dog home-returning twenty or thirty miles across a strange district by means of instinct." And as evidence of his conclusion that "there is an attribute of animals, neither scent, sight, nor memory, which

enables them to perform the home-returning journeys," this gentleman said:

"When I resided at Selhurst, on the Brighton & South Coast Railway, a friend living at Sutton gave me an Irish retriever bitch. She came over to him about a month previously from the County Limerick, where she was bred; and during her stay at Sutton she was on chain the whole time, with the exception of two walks my friend gave her in the direction of Cheam, which is in an opposite quarter to Selhurst from Sutton. She came to me per rail in a covered van, and the distance from home to home is about nine miles. She was out for exercise next morning, ran away, and turned up at her previous home the same afternoon."

But this proved to be a mild instance of such performances. A fox-hound was taken by train in a covered van forty miles from the kennels of one hunt to those of another in Ireland. The hound was tied up for a week, and then she was taken out with the pack. She hunted with them for the day, and returned in the evening to within a hundred yards of the kennel. "Here," relates the narrator, "I noticed her go into a field, sit down, and look about her. I called out to the young gentleman who hunts the hounds, whose way home

was the same as mine: 'J., Precious is not going on with you.' 'Oh, there's no fear of her,' was the reply. 'As she came so far, she will come the rest of the way.' So we went on to the kennel close by, but Precious did not appear, and we came back at once to the spot, sounded the horn, and searched everywhere. That was at six o'clock in the evening. On the following morning at six o'clock, when the messman went to the kennel door at Doneraile, Precious was there."

An officer took a pointer, which certainly had never been in Ireland before, direct from Liverpool to Belfast, where he was kept for six months at the barracks. He was then sent by train and cart, in a dog-box, thirty-four miles into the country, and tied up for three days. Being let out on the morning of the fourth, he at once ran away, and was found that same evening at the barracks at Belfast.

A sheep-dog was sent by rail and express wagon from the city of Birmingham to Wolverton, but, escaping from confinement the next Saturday at noon, on Sunday morning reappeared in Birmingham, having travelled sixty miles in twenty-four hours. Says one writer: "I was stopping with a friend about eighteen miles from Orange, New South Wales. My host brought a half-grown kit-

ten sixteen miles by a cross-bush track, tied in a flour-bag at the bottom of a buggy. She was fed that night; in the morning she had disappeared. She was home again in rather less than four days." The same person owned a horse in the interior of Australia, which, after two years of quiet residence on his run, suddenly departed, and was next heard of one hundred miles away, at the run of the old master from whom it had been stolen years before.

A rough-coated cur was taken by a gentleman to whom he had been given from Manchester to Liverpool by train, thence to Bangor, North Wales, by steamboat; but on landing at Bangor the dog ran away, and the fourth day afterwards, fatigued and foot-sore, was back in his home kennel, having undoubtedly travelled straight overland the whole distance. The same gentleman knew of a kitten that was carried in a covered basket six miles from one side of Manchester to the other, and found its way back the next day through the turbulent streets. Similarly, a fox-hound transported in a close box between points one hundred and fifty miles distant, and part of the way through the city of London, came back as soon as let loose. A retriever bitch did the same thing from Huddersfield to Stroud, a fortnight after being taken to

the former place by rail; and a fox-hound returned from Kent to Northamptonshire, which are on opposite sides of the Thames; finally a dog came back to Liverpool from a distant point, whither he had been forwarded by rail *in the night.*

So many such instances are recorded that I refrain from mentioning more, except a couple of very illustrative ones which I find vouched for in the Rev. J. G. Wood's valuable little book, *Man and Beast.* A mechanic who worked in Manchester, but lived in Holywell, Wales, having been home on a visit, was given a dog to take back with him. "He led the animal from Holywell to Bagill by road, a distance of about two miles. Thence he took the market-boat to Chester, a distance of about twelve miles, if I remember right. Then he walked through Chester, and took rail for Birkenhead. From that station he walked to the landing-stage, and crossed the Mersey to Liverpool. He then walked through Liverpool to the station in Lime Street. Then he took rail to Manchester, and then had to walk a distance of a mile and a half to his home. This was on Wednesday. He tied the dog up, and went to his work on Thursday as usual; and on the Sunday following, thinking that the dog was accustomed to the place, he set

it at liberty. He soon lost sight of it, and on the Wednesday following he received a letter from his mother, stating that the dog had returned to her. Now you will see that the dog went first by road, then by market-boat, then through streets, then by rail, then by steamer, then through streets again, then by rail again, then through streets again, it being dark at the time." Whether the animal really did follow the back-track with all this exactness or not, one thing is certain, he had sagacity enough to find his way, and (as is noteworthy in all these incidents) did so with astonishing speed.

The second instance is still more striking, and illustrates very forcibly the strong love of home in the dog, which is the motive in all these extraordinary and difficult journeys. "A gentleman in Calcutta wrote to a friend living near Inverkeithing, on the shore of the Frith of Forth, requesting him to send a good Scotch collie dog. This was done in due course, and the arrival of the dog was duly acknowledged. But the next mail brought accounts of the dog having disappeared, and that nothing could be seen or heard of him. Imagine the astonishment of the gentleman in Inverkeithing when, a few weeks later, friend Collie bounced into his house, wagging his tail, barking furiously,

and exhibiting, as only a dog can, his great joy at finding his master." Inquiry showed that the dog had come aboard a Dundee collier from a ship hailing from Calcutta.

Comparing all these examples and many others —for hundreds, almost, of similar cases with various animals might be cited—certain general facts appear.

First, incidentally, brutes equally with men become homesick. Those that stay away, as well as those that return to their former homes, show this very plainly, and often pitiably. This feeling is the motive which leads them to undergo perils and hardships that no other emotion would prompt them to undertake or enable them to endure. But it is the *most thoroughly domesticated* and *most intelligent* breeds of animals that this homesickness attacks the most severely; while, correlatively, the most difficult feats of finding their way home are manifested by the same class. It is the finely bred horses, the carefully reared pigeons, the highly educated pointers, fox-hounds, and collies that return from the longest distances and over the greatest obstacles.

This would seem to indicate that the homing ability is largely the result of education; whatever

foundation there may have been in the wild brute, it has been fostered under civilizing influences, until it has developed to an astonishing degree. I would like to ask any one who believes that this ability is wholly a matter of intuition—an innate faculty—why such an instinct should have been planted in the breast of animals like dogs and horses in their wild condition? They had no homes to which they could become attached as they do now in their artificial life; or when they did settle during the breeding season in any one spot, either they did not quit it at all, wandered only for a short distance, or else the females alone remained stationary, while the males roved as widely as usual. There would seem to be no call, therefore, for such an instinct in the wild animal. That they may always have had, and do now possess, a very acute sense of direction, enabling them to keep the points of the compass straight in their minds far better than we can, I am willing to admit; but I doubt whether the evidence proves a nearer approach to a homing "instinct" than this. On the contrary, I believe, as I have already hinted, that beyond this the performances of animals in the line of our inquiry are the result of accurate observation and very retentive memory. That all these animals

now and then do miss their bearings, get "turned around" and wholly lost, is true, and is a fact to be remembered in this discussion.

In the case of the birds, observation by sight is sufficient. They rise to a height whence they can detect a landmark, and, flying thither, catch sight of another. The experience of pigeon-trainers shows this satisfactorily, and that of the falconers supports it. The far-reaching eyesight of birds is well known. Kill a goat on the Andes, and in half an hour flocks of condors will be disputing over the remains, though when the shot was fired not a single sable wing blotted the vast blue arch. The same is true of the vultures of the Himalayas and elsewhere. Gulls drop unerringly upon a morsel of food in the surf, and hawks pounce from enormous heights upon insignificant mice crouching in fancied security among the meadow stubble, while an arctic owl will perceive a hare upon the snow (scarcely more white than himself) three times as far as the keenest-eyed Chippewa who ever trapped along Hudson Bay. The eyesight, then, of pigeons and falcons is amply powerful to show them the way in a country they have seen before, even though the points they are acquainted with be a hundred miles apart.

In the cases of horses, dogs, and cats the explanation may be more difficult, and not always possible to arrive at. Horses and mules are extremely observant animals, and quick to remember places; everybody who has ever had anything to do with them must know this. Their recollection is astonishing. The Rev. J. G. Wood tells of a horse which knew its old master after sixteen years, though he had grown from a boy to a man, and was, of course, much changed in both voice and appearance. It is probable that, where horses come back, they do so mainly by sight and memory.

As for dogs, they not only can see well, but they have the additional help of their intelligent noses. The proficiency to which some breeds of dogs have brought their smelling powers—the precision with which they will analyze and detect different scents —is surprising. I have lately seen trustworthy accounts of two hunting-dogs, one of which pointed a partridge on the farther side of a stone wall, much to the surprise of his master, who thought his dog was an idiot; and the other similarly indicated a bird sitting in the midst of a decaying carcass, the effluvium of which was disgustingly strong, yet not sufficiently so to disguise the scent of the bird to the dog's delicate nostrils. Fox-hounds will

trace for miles, at full speed and with heads high, the step of a Mercury-footed fox, simply by the faint odor with which his lightly touching pad has tainted the fallen leaves.

There are few cases where a dog is taken from one home to another when he could not see most of the time where he was going. In that complicated journey of the Holywell workman's pet from northern Wales to Manchester, the little fellow had his eyes open the whole distance, we may be sure, and if he could speak he would no doubt tell us that he remembered his previous journey pretty well. But many times, especially where transported by rail, it is unquestionable that dogs rely upon their noses to get them back. Finding that they are being kidnapped, carried off from home and friends in this confined, alarming fashion, unable to see out of the tight box of the close car, they do just what you or I would do under similar circumstances —exert every possible means left them of discovering whither they are going, and take as many notes as possible of the route, intending to escape at the very first opportunity. One means of investigation remaining is the scent, and this they would use to great advantage, examining the different smells as their journey progressed, and stow-

ing them away in their memory to be followed back in inverse order when they have a chance to return.

Granting to these animals the discriminating sense of smell which experience shows to be possessed by them, I do not see any reason why they should not be able to remember a journey by its succession of odors just as well as they would by its successive landmarks to the eye. Even we, with our comparatively useless noses, can smell the sea from afar; can scent the sweetness of the green fields as well as the smokiness of black towns; and can distinguish these general and continuous odors from special or concentrated odors, which latter would change direction as the smeller changed position. How far this sense really has been developed in the human subject, perhaps few know; but in the history of Julia Grace, the deaf and blind mute of Boston, for whom the late Dr. Howe accomplished so much, occurs a striking example. In her blindness and stillness, Julia's main occupation was the exercise of her remaining senses of touch, taste, and smell. It was upon the last, we are told, that she seemed most to rely to obtain a knowledge of what was going on around her, and she came finally to perceive odors utterly insensi-

ble to other persons. When she met a person whom she had met before, she instantly recognized him by the odor of his hand or glove. If it was a stranger, she smelt his hand, and the impression remained so strong that she could recognize him long after by again smelling his hand, or even his glove, if he had just taken it off; and if, of half a dozen strangers, each one should throw his glove into a hat, she would take one, smell it, then smell the hand of each person, and unerringly assign each glove to its owner. She would pick out the gloves of a brother and sister by the similarity of odor, but could not distinguish between them. Similar cases might be produced, though hardly one of superior education in this respect; and in the light of it, it is not difficult to suppose that a sharp dog should be able to follow back a train of odors that he had experienced shortly before.

But there is another way by which anxious animals may learn their route both going and coming, and that is by listening and inquiring. It is remarkable how much of what is said by their masters all dogs understand. The books and periodicals of natural history and sport abound with illustrations of this, and one lately occurred within my own experience. A very good-natured and

amusing, but utterly unthoroughbred little dog was a member of a family which I was visiting. The dog and I became very good friends at once, and remained so until the second day, when I casually began to joke his master upon owning such a miserable cur. At once the little dog pricked up his ears, and, noticing this, I continued my disparagements in a quiet, off-hand tone, his master meanwhile defending and condoling with him, until at last the dog could stand it no longer, but, without any provocation beyond my language, which was not addressed to him at all, sprang up and softly bit at my heel, as though to give me warning of what might happen if the joke went any further; and after that he utterly broke off our friendship.

I mention this incident to call attention to the alertness of our household pets in hearing and comprehending what is being said. Could not a dog on a railway remember the names of the towns through which he passed as they were called out by the attendants and spoken by travellers, and so be able to judge something of his way in return? The Rev. Mr. Wood suggested that the collie which returned from India was enabled to find the right vessel at Calcutta by hearing the well-known lan-

guage and accent of the Scotch sailors; and again picked out from among many others the right collier in which to finish the journey, partly by remembrance of the rig, but also by recognizing the still more familiar and homelike dialect of the Dundee men. In a country where dialects are so marked as in Great Britain, this sort of observation would no doubt be a great help to an intelligent animal. Take the case of the Holywell workman's dog. It is quite possible that he discovered the right route from Liverpool, whither it would not be so difficult to make his way from Manchester, by following some rough-tongued Welshmen until he found himself among his own hills again.

But there is still more to be said about this part of a homesick animal's resources and ingenuity. I am firm in my belief that animals have a language of signs and utterances by which they communicate with each other, and that their vocabulary, so to speak, is much larger than it has generally been considered to be. Dupont de Nemours declared that he understood fourteen words of the cat tongue. I am perfectly convinced that those two wicked little mules of ours, which ran away so disgracefully from our camp in Wyoming, had planned the whole thing out beforehand, and thus

very likely had made up their minds as to the road. They had been bitter enemies, biting and kicking each other, contesting for coveted places in the line, and quarrelling the whole trip. But the evening before they ran away they were observed to be very amicable. It attracted our notice, and the last that was seen of them in the morning, just before they bolted, they stood apart from the rest with their heads together, and their ears erect, waiting the right moment to dart away together. Tell a mountain mule-driver that the little beasts do not talk among themselves (chiefly in planning cunning mischief), and he will laugh in your face.

Cats, we know, consult a great deal together, and two street dogs often become great cronies. Why should not these dogs and cats be able to tell stray companions something which should help them on their way? I believe they do—just how, I don't pretend to say.

It seems to me, therefore, that the examples cited above, and a host of others like them, show that all domestic animals have a very strong love of places and persons. In many cases this home-sickness is so strong as to lead them to desert a new abode, when transferred to it, and attempt to return to their former home; but they *rarely or*

never do so without having a definite idea in their minds as to the route, although it is often very long and circuitous, and hence they almost invariably succeed; *otherwise, they do not try.* It is not every animal, by a long list, that deserts a new home the moment the chain is loosed; only one, now and then. In regard to the method used by them to find their way, it appears that they have no special instinct to guide them, but depend upon their memory of the route, the knowledge of which was acquired by an attentive study through the senses of sight, smell, and hearing, and that their search may possibly be aided by communication with other animals. The phenomenon, as a whole, affords another very striking example of animal intelligence.

XIV

A MIDSUMMER PRINCE

CECILIUS CALVERT, second Baron of Baltimore, has a hold upon the recollections of mankind far surpassing that secured by any monument in the noble town which he founded, in the fact that the most charming bird that makes its summer home in the parks of our cities bears his name. That bird is the Baltimore oriole—*Icterus baltimore* of Linnæus. Its plumage is patterned in orange and black, the baronial colors of the noble lord's livery; and Linnæus only paid an appropriate compliment to the source to which he owed his

specimen of the new species, when, in 1766, he recognized the coincidence in the name.

Then, as now, the orioles were among the most beautiful and conspicuous of woodland birds. From their winter retreat under the tropics they return northward as the warm weather advances, arriving in Maryland during the latter part of April, and reaching central New England by the middle of May. The males come in advance, and instantly announce their presence by a loud and joyous song, continually emulating one another during the week or more that elapses before the arrival of the females. But this emulation does not end with vying in song; they have many pitched battles, chasing each other from tree to tree and through the branches with angry notes. The coming of the females offers some diversion to these pugnacious cavaliers, or at least furnishes a new *casus belli;* for, while they devote themselves with great ardor to wooing and winning their coy mistresses, their jealousy is easily aroused, and their fighting is often resumed. Even the lady-loves sometimes forget themselves so far as to attack their fancied rivals savagely, or to drive out of sight the chosen mate of some male bird whom they want for themselves. This is not all fancy, but lamentable fact.

Mademoiselle Oriole is not so showy as her gay beau. Persuade the pair to keep quiet a moment, and compare them. They are in size between a bluebird and a robin, but rather more slender than either. The plumage of the male is of a rich but varying orange upon all the lower parts, underneath the wings, upon the lower part of the back, and the outer edges of the tail; the throat, head, neck, the part between the shoulders, wing quills, and middle tail feathers are velvety black; the bill and feet are bluish; there is a white ring around the eye, and the lesser wing quills are edged with white. In the female the pattern of color is the same, but the tints are duller. The jet of the male's head and neck is rusty in his mate, and each feather is margined with olive. The orange part of the plumage is more like yellow in the female, and wing and tail quills are spotted and dirty. Three years are required for the orioles to receive their complete plumage, the gradual change of which is beautifully represented in one of Audubon's gigantic plates. "Sometimes the whole tail of a [young] male individual in spring is yellow, sometimes only the two middle feathers are black, and frequently the black on the back is skirted with orange, and the tail tipped with the same color."

Much confusion arose among the earlier naturalists from this circumstance, though not quite so much as ensued upon the discovery of the cousin of this species—the orchard oriole—which bears the specific name *spurius* to this day as a memory of the time when ornithologists called it a "bastard."

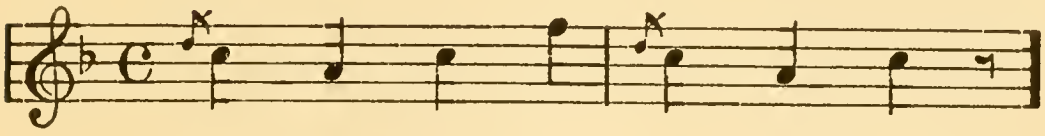
The singing of the males is at its height now that the females have come, and they are to be heard, not only from field and grove and country way-side, but in the streets of villages, and even in the parks of cities, where they are recognized by every school-boy, who calls them fire-birds, golden-robins, hang-nests, and Baltimore birds. The parks and avenues of Philadelphia, the elm-embowered precincts of New Haven, the sacred trees of Boston Common, the classic shades of Harvard Square, and the malls of Central Park all echo to their spring-time music.

The song of the oriole is indescribable, as to me are the tunes of most of the songsters. Nuttall's ingenious syllables are totally useless for expressing the pure and versatile fluting which floats from the elm-tops. Wilson catches its spirit when he says that "there is in it a certain wild plaintiveness and *naïveté* extremely interesting," and that

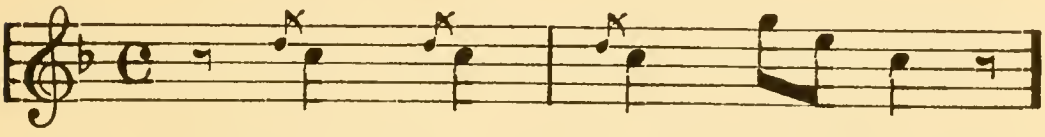
it is uttered "with the pleasing tranquillity of a careless plough-boy whistling for his own amusement." It is a joyous, contented song, standing out from the chorus that greets our half-awakened ears at daylight as brightly as its author shines against the dewy foliage. T. W. Higginson exclaims, "Yonder oriole fills with light and melody the thousand branches of a neighborhood." It is a song varying with the time and circumstances, and, as among all birds, some orioles are better performers than others. Dr. Brewer thought that when they first arrived, and were awaiting the females, the voices of the males were loud and somewhat shrill, as though in lamentation, and that this song changed into a "richer, lower, and more pleasing refrain" when they were joined by their partners. The quality of their music is certainly different in different parts of the country, seeming, for example, to be more subdued towards the northern limit of their range.

A writer in an old number of *Putnam's Magazine* (Mr. C. A. Munger, June, 1869), describes two orioles with which he had been acquainted for several summers. These birds had taken up their residences within about a quarter of a mile of each other, one in a public park, and the other

in an orchard. "And often," says the narrator, "have I heard the chief musician of the orchard, on the topmost bough of an ancient apple-tree, sing,



to which the chorister of the park, from the summit of a maple, would respond, in the same key,



and, for the life of me, I never was able to tell whether their songs were those of rivalry or of greeting and friendly intercourse. And now if you will strike these notes on the piano, or, which is better, breathe them from the flute, you will know the song of the oriole, or rather obtain an idea of its general characteristics, for no two that I have ever heard sang the same melody."

The female also has a pretty song, which mingles with the brilliant tenor of the male during all the season of love-making; but as May merges into June, and the business of the summer begins, both cease their exalted strains, and only the mellow, ringing whistle is heard; then, as family cares

increase, they lay aside even this, and, except at dawn, are rarely heard at all.

But, after all, the chief interest about our oriole is its wonderful home, which hangs upon the outmost branches of the elms along the street or in the grove, and is completed by June 10. The nest is never found in the deep woods. Its maker is a bird of the sunlight, and is sociable with man. The haunts of the orioles are those grand trees which the farmer leaves here and there in his field as shade for his cattle, to lean over the brier-tangled fence of the lane, or droop towards the dancing waters of some rural river. "There is," says Thomas Nuttall, "nothing more remarkable in the whole instinct of our golden-robin than the ingenuity displayed in the fabrication of its nest, which is, in fact, a pendulous, cylindric pouch of five to seven inches in depth, usually suspended from near the extremities of the high, drooping branches of trees (such as the elm, the pear, or apple tree, wild-cherry, weeping-willow, tulip-tree, or button-wood)."

These words might in a general way apply to all the *Icteri,* most of which inhabit North or South America, have brilliant plumages, and build nests of matchless workmanship, woven and entwined in such a way as would defy the skill of the most

expert seamstress, and unite dryness, safety, and warmth. They are mostly pendulous from the ends of branches, and form thus a security from snakes and other robbers, which could easily reach them if placed on a more solid foundation; they also hold eggs and young safely in storms that wreck or overthrow most other bird-houses. They are formed of the different grasses, dry roots, lichens, long and slender mosses, and other advantageous materials often supplied by man's art. Among different species the structures vary in shape from resembling a compact ball to nearly every bottle-shaped gradation of form, until they exceed three or four feet in length. Many species being gregarious, they breed numerously in the same vicinity or on the same tree, resembling in this and other respects the weaver-birds, to which they are partly allied. But for us our Baltimore's nest possesses the most attractions; and as I shall have much to say concerning this fine example of a bird's architecture, I cannot begin better than by quoting Nuttall's description of it. It would be impossible for me to say anything different and as well:

"It is begun by firmly fastening natural strings of the flax of the silk-weed, or swamp hollyhock,

or stout artificial threads, around two or more forked twigs, corresponding to the intended width and depth of the nest. With the same materials, willow down, or any accidental ravellings, strings, thread, sewing-silk, tow, or wool that may be lying near the neighboring houses or around grafts of trees, they interweave and fabricate a sort of coarse cloth into the form intended, towards the bottom of which they place the real nest, made chiefly of lint, wiry grass, horse and cow hair; sometimes, in defect of hair, lining the interior with a mixture of slender strips of smooth vine bark, and rarely with a few feathers; the whole being of a considerable thickness and more or less attached to the external pouch. Over the top the leaves, as they grow out, form a verdant and agreeable canopy, defending the young from the sun and rain. There is sometimes a considerable difference in the manufacture of these nests, as well as in the materials which enter into their composition. Both sexes seem to be equally adepts at this sort of labor; and I have seen the female alone perform the whole without any assistance, and the male also complete this laborious task nearly without the aid of his consort, who, however, in general, is the principal worker."

Many persons believe that there is a constant tendency in birds to vary their architecture to suit their surroundings, in accordance with climate, greater or less readiness of certain materials, and security. The Baltimore oriole affords a good illustration of this tendency. Like the swallows, robin, bluebird, pewit, and others, the oriole has abandoned the wilds for the proximity to man's settlements, doing it chiefly for two reasons—the greater abundance of insect food and protection from hawks, owls, and crows, which are fewer in number and less bold in the clearings.

In the swamps of the Gulf States, the Baltimore, finding no necessity for great warmth or shelter from chilling winds, fabricates an airy nest of Spanish moss (*Tillandsia usneoides*). Audubon described and figured such a one, but the exact truth of Audubon's description was rather doubted until the Boston Society of Natural History received other similar nests from Florida. In these cases the bird chose material both easily obtainable and perfectly suited to the temperature, in preference to the flax and felt which it would have used in the North.

We may suppose that the oriole, having learned that the place for its home safest from all maurad-

ing animals and reptiles was out upon the tips of the swaying twigs, which would not bear the marauder's weight, would also have learned the shape best adapted to that situation; and that if it knew enough to choose the lesser danger from man in order to escape a greater one from hawks when it came out of the deep woods, it would also have reason enough to alter its style of building in such a way as should best hide the sitting bird from the prying eyes of its winged enemies, and at the same time afford dryness and warmth to the interior. Both of these were secured in the thick branches of the primeval forest by the leaves overhead and around. It is hence found that in the same climate the more exposed a nest is the denser its composition, the deeper the pouch, and the smaller its mouth. Pennant and others of the earlier writers on American birds described the orioles' nests as having only a hole near the top for entrance and exit, like those of some of the South American species. Wilson, who was the first real critic of our ornithology, said this was certainly an error, adding, "I have never met with anything of the kind." Both authors seem to have made too sweeping assertions, and, as usual, there is a golden mean of fact.

Our hang-nest has enough discernment to select the safest and best site for a nest ever chosen by a tree-building bird. He has sufficient discretion to inhabit trees where his young will be least exposed to birds of prey. He has sense and skill enough to build a warm or cool house to suit the climate—a deep and tight one where the sun shines brightly, and sharp eyes might see the orange coat of himself or his mate within, and a loose and (in labor) less expensive one where deep shadows hide it. Surely, then, this consummate workman has ingenuity enough to put a roof over his dwelling to shed the rain and the hawk's glances, leaving only a little door in the side. Both of these things the hang-nest actually does. I myself have seen a nest of his making, over the open top of which a broad leaf had been bent down and tied by glutinous threads in such a way as to make a good portico. Mr. Thomas Gentry found a much more complete example at Germantown (Philadelphia), Pennsylvania, where the orioles "were constrained to erect a permanent roof to their dwelling by interwoven strings through the deprivation of the verdant and agreeable canopy which the leaves would naturally afford. . . . So nicely is the roof adjusted that even the most critical investigation

cannot discern the union. The entrance is a circular opening situated in the superior third of the nest, facing southwardly." Mr. Gentry considers this the latest improvement upon a nest which in the beginning was simply a hammock in the fork of a tree, like a vireo's, but which has been made more and more pendulous, until what was at first the whole nest is now only the lining at the bottom of a deep, enclosing bag.

With the idea of testing Wallace's theory that birds of bright colors, easily detected by birds of prey, are always found to occupy concealing nests, Dr. C. C. Abbott, of Trenton, New Jersey, made extensive notes upon the nests of our subject. In every instance those nests which fully concealed the sitting bird were at a considerable distance from any house in uncultivated parts. In all such localities sparrow-hawks were seen frequently, as compared with the neighborhoods selected for building the shallower open-topped nests, all of which were in willow or elm trees in the yards of farm-houses. The conclusion drawn was that the orioles knew where danger from hawks was to be apprehended, and constructed accordingly—the less elaborate nest in the farmer's yard answering every purpose for incubation. Dr. Abbott says,

however, that of the nests that did conceal the sitting bird, every one was really open at the top, and the bird entered from above. Its weight, when in the nest, appeared to draw the edges of the rim together sufficiently to shut out all view of the occupant. It is his opinion, however, that years ago, when its enemies were more numerous, the nest of this oriole was perfectly closed at the top, and with a side opening; but he finds none so now.

The question why this species alone among our birds is supposed to have learned by dear experience to take such precautions against its foes has already been answered: it is because the Baltimore oriole is almost the only species in which the female is not protected from observation by her neutral and dull colors.

Nuttall thought both sexes equally expert at nest-building, although the labor principally devolved upon the female; the latter clause in particular others have confirmed, and the rule is that the male occupies himself only in collecting materials for his mate. They labor very steadily, but a week's work is necessary for the completion of their home. It seems strange that domiciles constructed with so much pains should not be occupied successive seasons, but this seems never to be the case.

It sometimes happens, however, that orioles will pick to pieces an old nest to get materials for a new one, just as the Indians of Peru often construct their huts of the cut-stone blocks of the ancient palaces of the Incas. These birds are very knowing in gathering stuff for the frame-work of their homes, and perceive the adaptability to their needs of the housewife's yarn and laces, hung out to dry, much sooner than they perceive the immorality of stealing them. White cotton strings are rarely absent from their nests, which are sometimes almost entirely composed of them. Some curious anecdotes have been related of this economical propensity and its results; Nuttall tells the following: "A female, which I observed attentively, carried off to her nest a piece of lamp-wick ten or twelve feet long. This long string and many other shorter ones were left hanging out for about a week before both ends were wattled into the sides of the nest. Some other little birds, making use of similar materials, at times twitched these flowing ends, and generally brought out the busy Baltimore from her occupation in great anger."

A gentleman in Pennsylvania, observing an oriole beginning to build, hung out "skeins of many-colored zephyr yarn, which the eager artist readily

appropriated. He managed it so that the bird used nearly equal quantities of various high, bright colors. The nest was made unusually deep and capacious, and it may be questioned if such a thing of beauty was ever before woven by the cunning of a bird."

A few experiments have been made to learn whether this bird would exercise any preference as to color in selecting materials of this kind. They have not yielded very satisfactory results, and should be repeated. This is easily done by any one who observes an oriole beginning its structure, and will lay varicolored wools, separately, in view of the bird and note whether any color is preferred. An accumulation of such observations might determine something as to color sense.

The nest being done, the female begins to deposit her eggs, and continues laying one each day until four or five are laid. The eggs are pointed oval, .90 by .60 of an inch in dimensions, grayish white, with a roseate tinge in fresh and transparent specimens, and variously marked with blotches and irregular lines, like pen-scratches, of purplish brown. On the day following, incubation begins, and the eggs hatch at the end of about fifteen days, usually in the middle of June.

The courage and devotion of the parents in defence of their nests are known to every ornithologist. They expose themselves fearlessly to danger rather than desert their charge, and call upon heaven and earth to witness their persecution. I remember one such instance. I discovered a nest with eggs in a sycamore on the banks of the Yantic River, in Connecticut. In trying to examine it I roused the ire of the owners, who showed the most intense anger and dismay. Enjoying this little exhibition, I did all I could to terrify the fond parents without harming them at all, and then quietly watched the result. The birds flew close about the nest, screaming and uttering a loud rolling cry like a watchman's rattle, which very soon brought plenty of sympathetic and curious friends. A cat-bird ventured too near, and was pounced upon by the Baltimore with a fierceness not to be resisted. But when the cat-bird found he was not pursued beyond the shade of the tree, he perched upon a neighboring post, and by hissing, strutting up and down, and every provoking gesture known to birds, challenged the oriole, who paid no attention to his empty braggadocio. Next Mrs. Oriole did something distasteful to her lord, and received prompt chastisement. A confident kingbird dashed

up, and was beautifully whipped in half a minute. Vireos, pewits, warblers were attracted to the scene, but kept at a safe distance. There was no appeasing the anxiety of the parents until I left, and probably they spent the whole afternoon in recovering their equanimity.

The study of the expressions and dialects of animals and birds under such circumstances is extremely entertaining and instructive. Though you should happen upon a Baltimore's nest when the female is sitting, and the male is out of sight, the female will sit quietly until the very last moment; and Mr. Ridgway mentions an instance where the female even entered her nest while he was severing it from the branch, and remained there until carried into the house. The young birds, before they can fly, Dr. Brewer says, climb to the edge of the nest, and are liable in sudden tempests to be thrown out. If uninjured, they are good climbers, and by means of wings, bill, and claws are often able to reach places of safety. In one instance a fledgling which had broken both legs, and had been placed in a basket to be fed by its parents, managed by wings and bill to raise itself to the rim, and in a few days took its departure. To this dexterity in the use of the bill as a

prehensile organ the birds may owe their skill in weaving.

The young are fed upon an insect diet, and mainly upon caterpillars, which are disgorged after having been partially swallowed by the parents. They leave the nest after a fortnight, but are attended by the parent birds ten days longer before being turned off to take care of themselves. The food of the Baltimore oriole, old and young, consists almost entirely of insects, but it is varied, in civilized regions at any rate, by depredations upon the garden. Succulent young peas appeal to him particularly; and he has the curious and mischievous habit of robbing the cherry and plum blossoms of their stamens and pistils, scattering, but not eating, the petals. These are small matters; but he becomes a real pest to the vine-growers of the Hudson Valley, at least, by his apparently wanton forays upon the ripening grapes. It does not appear that he eats these to any extent, but seems simply to delight to thrust his beak into the biggest and ripest berries of each cluster, tearing them open, taking, perhaps, a sip of the juice, and then attacking the next one. Thus he spoils for market hundreds of clusters in a morning; and, as the grapes are raised and sold principally for table

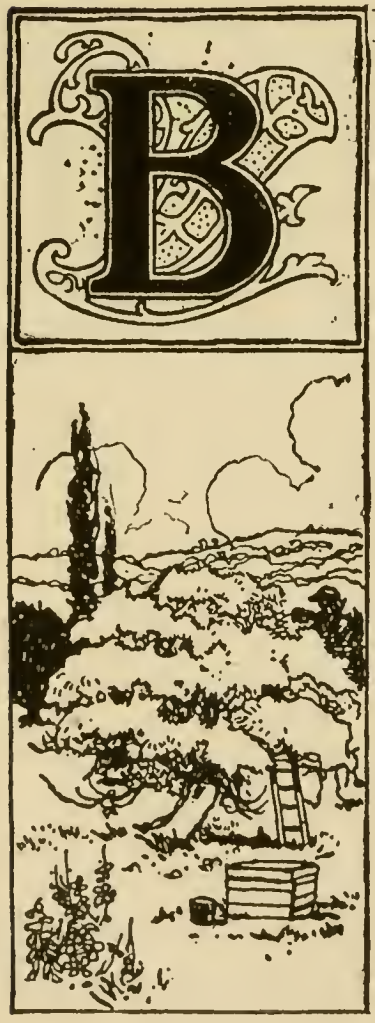
use, his depredations in the vineyards have become a serious matter.

But, after all, these robberies, annoying as they may be locally, are but a slight compensation for the invaluable services he renders the gardener in the destruction of hosts of noxious insects. At first beetles and hymenopterous insects form his diet, and he seeks them with restless agility among the opening buds. As the season progresses, and the caterpillars begin to appear, he forsakes the tough beetles, and rejoices in their juicy bodies, being among the few birds that will eat the hairy and disgusting tent-caterpillar of the apple-trees.

About the middle of September the Baltimore orioles begin to disappear, and by the last of the month all have left the northern States for their winter-quarters in Mexico, Central America, or the West Indies.

XV

A GENTLEMAN OF THE ORCHARD



BEHIND the old farm-house, stretching from the barn on one side to the lane that leads back to the hill wood-lot on the other, stands the ancient orchard.

It was planted perhaps a century ago, when this old farm was one of the outposts of civilization, and owes its origin to seeds brought from Rhode Island or Vermont, or possibly from England itself. The trees have grown to their full stature, and interlocking boughs now form a continuous canopy of shade, except where here and there one has fallen under some

fierce blast and has been removed for fuel. The stumps of these unfortunates soon became nuclei for thickets of briers sown by the wind from the raspberry and blackberry bushes along the fence; their rotting roots were quickly honey-combed by the galleries of termites, ants, and wood-boring grubs, and the dense coverts now form a place of refuge for mice and chipmunks, small ground-birds, grass-snakes, and an occasional blacksnake that creeps up from the brook to spread consternation throughout these verdant precincts. Only the wood-pile, the vegetable patch, and a line of currant and gooseberry bushes intervene between the back porch of the house and the gnarled and leaning apple and pear trunks.

No part of the farm is more delightful than this ancient orchard. It is the first feature to attract the admiring attention of the visitor from the city, and it is the favorite lounging-place of the rustic in his leisure moments. In April he watches the earliest opening of the foliage, greets the first reddening flower-buds, and gazes with joyful anticipation upon the whitening blossoms that soon make a vast bouquet of each aged tree and rejuvenate it. Afterwards, as the flowers carpet the sward with their rosy petals, and the tiny seed-

vessels, left behind, grow larger and greener day by day, he observes with interest the fattening of the little apples (beloved also of many insects), speculates on the prospect of a good yield, and by August tries his teeth on a yellowish one that has fallen, and perhaps finds a palatable bit on that side next the sun.

Then how the red and yellow and russet apples lie in bright, redolent heaps on the grass, forming zones about each trunk that reflect the afternoon sunlight as it glints ruddily among the branches and shimmers through the September haze in a soft glory; and what suggestions stir the mind of cider and winter-evening cheer to come!

This orchard is beloved of all birds, but with some it is a chosen and constant home. Here may be heard the disconsolate plaint of the wood-pewee, whose nest is a prize for sharp eyes—a tiny cup of bark shreds saddled upon a bough and covered with lichens, looking just like an old knot or scar; but the downy cup of the humming-bird will be an even greater prize. Of course, the robin, the brown thrush, the cat-bird, and that busybody the wren, are to be seen there every day, and now and then a bluejay or cuckoo. Here, too, reside the king-bird and his less familiar cousin, the great-crested

Nest of the Ruby-throated Humming-bird

fly-catcher, the latter attracting attention by his piercing yet not unmelodious whistle, and by his brave appearance, as, with crest erect, he perches upon some topmost twig and scorns the world—a very D'Artignan among birds.

There is another brown and crested bird in the orchard—the cedar-bird, or cherry wax-wing; but it wears a sleek, Quakerish dress of drab-brown, with blackish wings and a short tail tipped with yellow, and it has scarlet waxen tips on the ends of the smaller quills of the wing and sometimes of the tail. It is not likely to be confounded, therefore, with the dashing fly-catcher; moreover, it is the most silent bird in the list.

Many small warblers, vireos, and fly-catchers are likely to be seen here, because the decaying trees harbor hosts of insects—nuthatches, striped zebra-warblers, agile brown-creepers, small woodpeckers, and, most conspicuous of all, the purple finch, whose song has delightful sweetness and gayety. The word "purple" conveys to my mind a strong sense of blue; but here it alludes to the crimson which tints the feathers of the bird's head and breast, as though he had dived to the shoulders into ripe strawberries.

But there is one bird whose preference for the

place is so manifest that it takes its name from the circumstance; I speak of the orchard oriole, *Icterus spurius* of Linnæus, which is well known all over the middle parts of the United States, and which is one of the very few species that have managed to retain the technical name given it by its great sponsor.

Although by no means a dandy, like the Baltimore oriole, he is every inch a gentleman, and wears his neat dress of chestnut and black with an aristocratic air. Yet he is not above work. No bird is more ceaselessly active, and none is a better servitor of the agriculturist; for, from his first arrival in May until he joins small companies of his fellows for the southward journey in October, he is untiring in his pursuit of just those insects that the orchardist most dreads.

A quarter of an hour's watching of one will satisfy any one of his rightful claim to our admiration and thanks. He flies to a branch, moves his head from side to side, spies an inch-worm trusting—vain hope!—to its color to hide it on the green surface of a leaf, and pounces upon it in an instant. Then a nest of tent-caterpillars catches his eye, and he attacks it furiously, tearing apart the shreds of silk, and greedily devouring every one of the

writhing and horrid mass of worms—a meal few other birds will undertake. Even that does not satiate him, and he restlessly renews the search for those creeping larvæ of insects so desirable to him and his family, and many of which are so hateful to the farmer. He seems to revel in his work, and hurries about it with a busy and gleeful air, heedless of your espionage, his velvety coat gleaming among the glossy leaves or contrasting sharply with the aromatic blossoms.

The gayety that marks all his actions characterizes his song. He whistles a clear, full tone—not the reiterated bugle-call of the Baltimore, but a sprightly, impromptu air, hastening from note to note as though singing against time, and yet under protest at the speed he is forced to assume, causing an embarrassed feeling that he is not doing his best. This remarkable song is thus quite indescribable, and is not much heard after the early part of June, when family cares begin to curb the singer's exuberant spirits.

Finding its pleasure and profit in familiarity with men, this oriole makes its home almost exclusively in orchards, and is found breeding from the Rio Grande to Lake Erie, but rarely eastward of the Hudson River. Its migratory journeys in

winter carry it to the West Indies and Central America. It shows a slight tendency to gregariousness, even in breeding; for several nests may frequently be seen in adjoining trees, all the proprietors keeping upon the most neighborly terms with each other and with other birds.

The nest is ordinarily suspended only a few feet from the ground, between the gnarled twigs near the end of an apple bough, to which it is strongly bound, and beneath which it is essentially pensile, although by no means so freely swinging a pouch as the structure of the Baltimore oriole. Nevertheless, it is sometimes hung (much after the pendulous manner of its cousin's) among the pendent tips of drooping willow branches, several of which will be found woven into the sides in such a way as to serve as upright ribs or stays. Such nests are likely to prove of neater workmanship and perhaps a trifle greater in depth than others. In both cases, however, the shape and proportions are nearly the same, the cavity being about as large as a coffee-cup. The walls are rather thin, particularly in nests built at the South, where a circulation of air is so desirable.

The material of which this beautiful and easily recognized structure is composed consists usually

of pliant stems and blades of yellowish-green grass, often with the ripe heads left on, giving a somewhat rough appearance in many cases to the outside of the nest. This grass is woven into a firm basket, the stems being as closely interlaced as if done with a needle. Sometimes there is a lining of thistle and cottonwood blossoms, the downy breast feathers of ducks, etc., forming a soft mat at the bottom.

The leaves growing about the nest are often carefully arranged—apparently by the provident skill of the bird—to shed the rain, shade the sitting mother, and conceal the domicile. The last intention certainly is so well accomplished that the nest is difficult to discover, no matter how familiar you may be with the orchard or grove in which you are certain it must be situated, since its color harmonizes closely with its surroundings.

While this is the customary type of nest in the interior of the country, and one remarkable for its uniformity over a wide region, interesting variations occur on the seaboard. Thus, in the pine woods of southern New Jersey these birds build homes of a quite different character, placing at the extremities of upper branches of pine-trees nests which are not pensile in any sense, but are sup-

ported in the midst of a cluster of twigs, and consist largely of pine-needles. I know a certain group of pines upon a farm near Trenton, where a sociable colony constructed and inhabited such untypical nests year after year for half a century.

Again, in the northern part of New Jersey, less than a hundred miles distant, the orchard orioles never fix upon pine branches as a site, but inhabit fruit-trees exclusively, making a nest of the usual interwoven grasses, without any admixture of pine-needles, but *not pensile*, it being upheld as before in the midst of a clump of twigs, to which it is securely fastened. Moreover, a competent observer in this district tells me he has never known the orioles there to use the same nest twice, whereas at Trenton not only do they return to the ancestral tree season after season, but always tear the old nest to pieces with amusing vehemence to obtain material for the construction of a new one, which is occasionally erected upon the foundation of the earlier structure.

Such traits of individuality, here amounting to an alteration in the very type of the nest structure, are always extremely interesting in bird life; and the variations of practice and product to which they tend are highly suggestive when we lift our

study from a single pair to the species they represent.

The elongated eggs are pure white, marbled with irregular streaks of black and leather brown, much after the pattern of those of the Baltimore and other American orioles.

Wilson says this songster may be easily reared from the nest, and in confinement becomes very tame and familiar.

XVI

BANK-SWALLOWS

THE bird which is the subject of this sketch is familiar to all who walk in green pastures and beside still waters; for in such haunts do the bank-swallows congregate in merry companies, making up for their want of companionship with man, which is so characteristic of the other hirundines, by a large sociability among themselves. Conservator of ancient ways, it is almost the only swallow which has not attached itself to humanity as soon as it had opportunity, and changed from a savage to a civilized bird. Per-

haps it, too, has tried it long ago, and voluntarily returned to the fields; for our bank-swallow is a cosmopolite, and has watched the rise and fall of all the dynasties and nationalities that have grouped the centuries into eras. Even now it is an inhabitant of all Europe and eastward to China; of a large part of Africa, especially in winter; and throughout North America, the West Indies, Central America, and the northern Andean countries. On both continents its wanderings extend to the extreme north, where, in Alaska, it is one of the commonest summer visitors. So this modest little bird, smallest of its kind, is entitled to our respect as a traveller at least; and, to compare the habits and appearance of the representatives in different portions of the globe of so widely distributed a species, becomes a most interesting study.

Cotyle riparia, the bank-swallow, sand-martin, sand-swallow, river-swallow, l'hirondelle de rivage, or back-svala, is generally diffused over the northern hemisphere, though very unequally, avoiding those spots unfavorable to it. In this distribution it seems to have been somewhat influenced by man, though owing him no other favors than the incidental help of railroad cuttings and sand-pits, which have increased the sites suitable for

its nests, and thus enabled the species to spread inland.

It is one of the earliest birds to arrive in the spring, appearing in Old England during the last week in March, and in New England early in May—many passing on to the shores of the Arctic Ocean, where Richardson, at the mouth of the Mackenzie, and Dall, on the Yukon, found them breeding in immense numbers. In these high latitudes its summer is necessarily a brief one, and September finds it back again, picking up congeners for company on the southward journey.

Where these and other swallows spend the winter was a hotly debated question among ornithologists at the beginning of the nineteenth century; some affirming that they migrate with the sun, while others, believing it impossible that such small and delicate birds could endure the great fatigue and temperatures incident to such a migration, held that they regularly hibernated during the cold weather, sinking into the mud at the bottom of ponds, like frogs, or curling up in deep, warm crannies, like bats, and remaining torpid until revived by the warmth of spring. Of this latter opinion was White, of Selborne, who alludes to it again and again; and Sir Thomas Forster wrote a *Mono-*

graph of British Swallows, apparently with no other object than to present the arguments for and against the theory of their annual submersion and torpidity. One of the difficulties which the *submersionists* put in the way of the *migrationists* was the frequent accidental and isolated appearance of the swallow before its usual time—a fact which has occasioned a proverb in almost every language. The French have, *"Une hirondelle ne fait pas le printemps";* the Germans, *"Eine Schwalbe macht keinen Sommer";* the Dutch, *"Een zwaluw maak geen zomer";* the Italians, *"Una rodine non fa primavera";* the Swedes, *"En svala gor ingen commar";* which all mean, *"One swallow doth not make a summer."* The story is well known of a thin brass plate having been fixed on a house-swallow with this inscription: "Prithee, swallow, whither goest thou in winter?" The bird returned next spring with the answer subjoined: "To Anthony, of Athens. Why dost thou inquire?"

Out of this controversy evidence of their sudden autumnal adjournment to Africa accumulated in England. Wilson, in this country, showed that their advance could be traced in the spring from New Orleans to Lake Superior and back again, and their regular migration soon came to be ac-

knowledged. Then attention was turned to the season, manner, and limits of their migrations, and it was found that, taking advantage of favorable winds, immense flocks of swallows—and many other birds of passage as well—flying very high, passed each fall from the coast of England to the coast of Africa, and from Continental Europe across the Mediterranean direct, whence they spread southward almost to the Cape of Good Hope. No sooner had the spring fairly opened than they were suddenly back again, very much exhausted at first with their long-sustained effort, but speedily recuperated and "diligent in business." Our own migrants, as I have mentioned, winter in Central America and the West Indies, or still farther south.

Their flight is rapid but unsteady, "with odd jerks and vacillations not unlike the motions of a butterfly," as White describes it; and continues: "Doubtless the flight of all hirundines is influenced by and adapted to the peculiar sort of insects which furnish their food. Hence it would be worth inquiry to examine what particular genus of insects affords the principal food of each respective species of swallow." They are constantly on the wing, skimming low over land and loch, pausing not even to drink or bathe, but simply dropping

into some limpid lake as they sweep by to sip a taste of water or cleanse their dirty coats. It seems strange, then, that birds who sustain the unremitting exertion of a flight scarcely less than one hundred miles an hour in speed, during the whole of a long summer's day, should not be thought capable of the transition from England to Africa. However, at that time it was not well understood what long-continued flight small birds actually do make, as, for instance, from our coast to Ireland, or from Alaska to Hawaii.

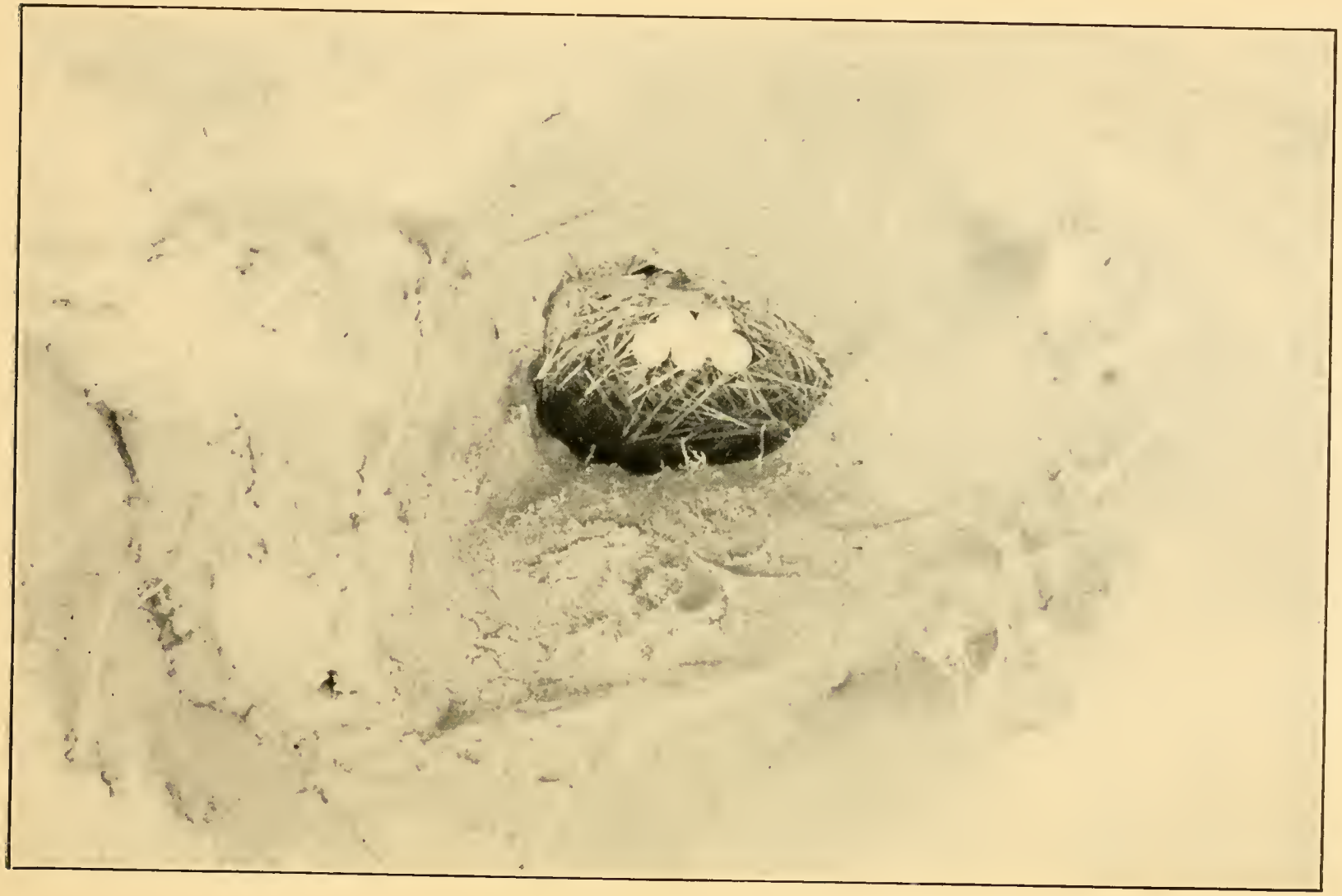
The bank-swallow is not a musical bird, a faint, squeaking chirrup being all its voice can accomplish; nor is it a handsome bird — simply sooty brown above, white beneath, with a brown breast. To its grace of motion and charming home life we attribute that in it which attracts us.

Although probably the least numerous of all the swallows, they do not seem so, because of the great companies which are to be seen together wherever they are to be found at all; and because, leading a more sequestered life, they are not usually brought into direct comparison with house-martins and chimney-swifts. Eminently social in their habits, they congregate not only at the time of migration (then, indeed, least of all), and in the

construction of their homes, but sometimes, like other species, they alight in great flocks on the reeds by the river-side and on the beach.

The secret of the local distribution of the bank-swallows lies in the presence or absence of vertical exposures of soil suitable for them to penetrate for the burrows at the inner end of which the nest is placed. Firm sand, with no admixture of pebbles, is preferred, and in such an exposure, be it sea-shore, river-bank, sand-pit, or railway cutting, the face will often be fairly honey-combed with burrows, so that we can readily believe that Mr. Dall counted over seven hundred holes in one bluff in Alaska. These are usually very close together, and the wonder is how the birds can distinguish their own doors. If mistakes do occur, I imagine they are all very polite about it, for I know of no more peaceable neighbors among birds than they. The mode in which this perforation is performed, requiring an amount of labor rare with animals, is well described by Mr. Rennie in his *Architecture of Birds*:

"The beak is hard and sharp, and admirably adapted for digging; it is small, we admit, but its shortness adds to its strength, and the bird works . . . with its bill shut. This fact our readers may



Nest of a Bank-swallow

verify by observing their operations early in the morning through an opera-glass, when they begin in the spring to form their excavations. In this way we have seen one of these birds cling with its sharp claws to the face of a sand-bank, and peg in its bill as a miner would his pickaxe, till it had loosened a considerable portion of the hard sand, and tumbled it down among the rubbish below. In these preliminary operations it never makes use of its claws for digging; indeed, it is impossible that it could, for they are indispensable in maintaining its position, at least when it is beginning its hole. We have further remarked that some of these martins' holes are nearly as circular as if they had been planned out with a pair of compasses, while others are more irregular in form; but this seems to depend more on the sand crumbling away than upon any deficiency in its original workmanship. The bird, in fact, always uses its own body to determine the proportions of the gallery, the part from the thigh to the head forming the radius of the circle. It does not trace this out as we should do, by fixing a point for the centre around which to draw the circumference; on the contrary, it perches on the circumference with its claws, and works with its bill from the centre out-

ward; . . . the bird consequently assumes all positions while at work in the interior, hanging from the roof of the gallery with its back downward as often as standing on the floor. We have more than once, indeed, seen a bank-martin wheeling slowly round in this manner on the face of a sand-bank when it was just breaking ground to begin its gallery.

"This manner of working, however, from the circumference to the centre unavoidably leads to irregularities in the direction. . . . Accordingly, all the galleries are found to be more or less tortuous to their termination, which is at the depth of from two to three feet, where a bed of loose hay and a few of the smaller breast-feathers of geese, ducks, or fowls is spread with little art for the reception of the four to six white eggs. It may not be unimportant to remark, also, that it always scrapes out with its feet the sand detached by the bill; but so carefully is this performed that it never scratches up the unmined sand, or disturbs the plane of the floor, which rather slopes upward, and of course the lodgment of rain is thereby prevented."

An exceedingly interesting chapter in Edmund Selous's *Bird Watching* is given to this bird, from which I wish to quote a few lines as to its work:

"It is interesting to watch the sand-martins building their nests, or, rather, excavating the tunnels in which they will afterwards be built. To see one enter one of these whilst it is yet but a few inches long, and then to see the dust powdering out at the aperture, as from the mouth of an ensconced cannon, is pretty. The sand is scattered out backward with the feet, but the bird also uses its bill as a pickaxe, often making a series of rapid little blows with it, almost like a woodpecker, the wings, which quite cover the body, quivering at the same time. Both sexes work at the hole, and both often fly together to it, one remaining clinging at the edge whilst the other scratches out the sand from the inside. . . . Sometimes three or four will descend upon the same hole and cling there without quarrelling; but once I saw a bird in a hole attacked by another, who flew suddenly upon it with a little twittering scream.

"Though each pair of birds excavate their own tunnel, yet the whole community, or, at any rate, a large proportion of it, will sometimes work together, sweeping on to the pit's face in a body, clinging there and burrowing, with a constant twittering, then darting off silently in a crowd and sailing and circling round in the pit's amphitheatre,

making, when the sky is blue and the sun bright, a warm and delicious picture such as the Greeks must have loved to gaze on.

"As each bird, however, only works at his own and his partner's hole, it is evident that this kind of social working is not the same as that of ants or bees and other such insect communities, though it has something of that appearance. Sometimes, for a short time, all the birds will keep fluttering round in small circles that only extend a little beyond the face of the cliff, not rising to a greater height than their own tunnels in it, which they almost touch each time as they come round. They look like eddies in a stream beneath the bank, but are not so silent, for all are twittering excitedly. This is an interesting thing to see—a kind of aërial manœuvres, the special cause of which, if there be one, is not obvious."

Sometimes the nest is carried to a far greater depth than two or three feet, as in a case observed by Mr. Fowler, in Beverly, Massachusetts, where, in order to get free of a stony soil, where pebbles might be dislodged and crush the eggs, the tunnel was carried in nine feet, while neighboring birds in better soil only went a third as far. In one place the burrows will be close to the top of the bluff; in

another near the bottom, according as fancy dictates or the birds have reason to fear this or that enemy. English writers agree that occasionally their bank-swallows do not dig holes, but lay in the crannies of old walls and in hollows of trees. This is never done, that I am aware of, in the United States; but in California a closely allied species, the rough-winged swallow, "sometimes resorts to natural clefts in the banks or adobe buildings, and occasionally to knot-holes." On the great plains, however, our *Cotyle* burrows in the slight embankments thrown up for a railway-bed, in lieu of a better place; and at St. Paul, Minnesota, I have seen them penetrating solid but soft sandrock.

"How long does it take a bird to dig his cavern under ordinary circumstances?" is a question which it would seem hard to answer, considering the cryptic character of his work. Mr. W. H. Dall says four days suffice to excavate the nest. Mr. Morris, a close observer of British birds, says, *per contra*, a fortnight, and that the bird removes twenty ounces of sand a day.

When the female is sitting you may thrust your arm in and grasp her, and, notwithstanding the noise and violence attending the enlargement of

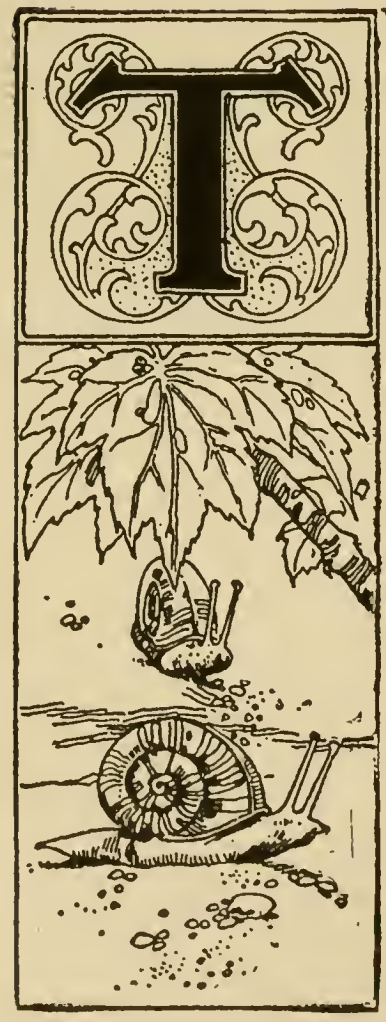
the aperture of her nest-hole, she will sit resolutely on, and allow herself to be taken in the hand with scarcely a struggle or sign of resistance—even of life, sometimes. The young are fed with large insects caught by the parents, particularly those sub-aquatic sorts which hover near the surface of still water; and White mentions instances where young swallows were fed with dragon-flies nearly as long as themselves. So are young purple martins. The young do not leave the nest until they are about ready to take full care of themselves. Finally, they are pushed off by the parents to make way for a second brood, and, inexperienced in the use of their wings, many fall a prey to crows and small hawks that lie in wait ready to pounce upon the first poor little fellow that launches upon the untried air. Those that manage to run the gantlet of the hawks collect in small companies by themselves, and have a good time hunting by day and roosting at night among the river-reeds, until the autumn migration. "At this time, Salerne observes," says Latham, "that the young are very fat, and in flavor scarcely inferior to the *ortolan*" —a European suggestion rather shocking to American ears. Sometimes the parents forsake their progeny in the nest, and seem generally to care

less for them than is usually the case among swallows.

But not the young alone are exposed to enemies. It would seem as though the situation of the nest precluded invasion, yet, if they are near the haunts of the house-sparrow, they are sure to be dispossessed of their homes by that buccaneer. Snakes, too, can sometimes reach their holes; weasels, like that one Mr. Hewitson tells us of, are often sharp enough to make their *entrée* from above: schoolboys regard the pink-white eggs a fine prize; and, last and worst of all, the bank-swallows are many times utterly worried out of their galleries by fleas and young horse-flies, which swarm and increase in their nests until the bird finds endurance no longer a virtue, and digs a new *latebra*.

XVII

IN A SNAILERY



TWO-THIRDS of the persons to whom I show the little land and fresh-water mollusks in my snailery either start back with an "Oh! the horrid things!" which causes me some amusement, or else gaze straight out of the window, saying languidly, "How interesting!" which hurts my pride. I confess, therefore, that it is contrary to experience to attempt to interest general readers with an account of

"Ye little snails, with slippery tails,
Who noiselessly travel across my gravel."

Yet why not? Snails are of vast multitude and variety, ancient race, graceful form, dignified manners, industrious habits, and gustatory excellence; *quod est demonstrandum.*

Snails differ from other gasteropodous mollusks chiefly in that they are provided with lungs, and thereby are fitted to live in air instead of water. Hence all true snails are terrestrial. As the snail crawls upon a cabbage-leaf, all that you can see of the body is the square head bearing two long and two short horns, with the muscular base tapering behind. There is an oily skin, and on the back is borne a shell containing the rest of the body, twisted up in its spiral chamber. Extending along the whole under surface of the body is the tough, corrugated disk upon which the animal creeps. This foot is the last part of the body to be withdrawn into the shell, and to its end, in a large division of pulmonate as well as marine mollusks, is attached a little horny valve which just fits the aperture of the shell and completely stops it up when the animal is within. This is called the operculum. The foot secretes a viscid fluid which greatly facilitates exertion by lubricating the path, and snails may often be traced to their hiding-places by a silvery trail of dried

slime. The exudation takes place most abundantly near the posterior extremity; and so tenacious is it that some species can hang in mid-air by spinning out a mucous thread; but, unlike the spider, have not the power to retrace their way by reeling in the gossamer cable. This ability to let themselves hang by a thread of mucus is more characteristic of young specimens than of full-grown ones, which seem to grow too heavy to intrust themselves to such suspension. The slime also serves the naked species as a protection, birds and animals disliking the sticky, disgusting fluid; and it serves others as a weapon, seeming to benumb whatever small creature it touches. The oleacina, of Cuba, thus frequently is able to feed upon mollusks of twice its strength.

The snail possesses an elaborate anatomy for the performance of all the functions of digestion, respiration, circulation, and reproduction. A collar of nervous matter encircles the throat, whence two trunks carry nerves throughout the body, and filaments pass forward to the "horns," the longer and superior pair of which end in minute eyes and are called "eye-stalks," while the shorter pair are only tactile organs, and hence "feelers." These tentacles are as expressive as a mule's ears, giving

an appearance of listless enjoyment when they hang down, and an immense alertness if they are rigid, as happens when the snail is on a march.

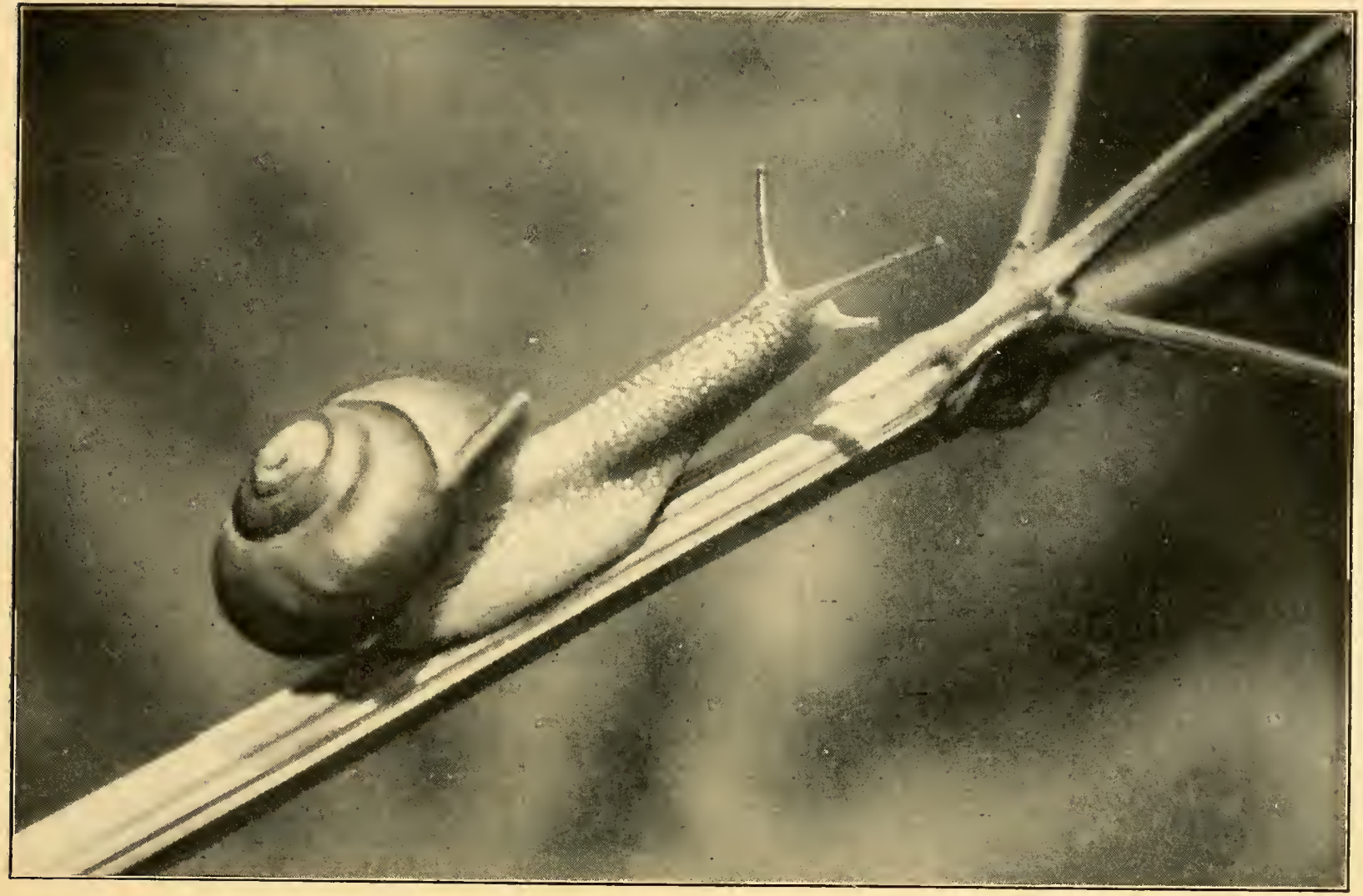
The eyes at the extremity of the stalks are well formed, though covered by a pellicle of skin. Of how much practical use they are seems a matter of doubt, Binney, Lubbock, and other authorities making little of their usefulness. Dr. James Weir, in his *Dawn of Reason,* on the other hand, regards them as of decided service to the animal. "Actual experimentation," he says, "declares that the garden snail can see a moving white object, such as a moving ball of cotton or twine, at a distance of two feet. In my experiments I used a pole ten feet in length, from the tip of which a white or dark ball was suspended by a string. The ball was made to describe a pendulum-like movement to and fro in front of the snail on a level with the tips of its horns. Time and again I have seen a snail draw in its horns when it perceived the white ball, to it an unknown and terror-inspiring object. I have likewise seen it change its line of march, and proceed in another direction, in order to avoid the mysterious white stranger dancing athwart its pathway. Dark-colored objects are not so readily perceived. . . . Sometimes it will not perceive the

[black] ball until it has been brought to within six or eight inches of its eye-stalks. During the season of courtship snails easily perceive one another at the distance of eighteen or twenty inches."

Organs of hearing exist in the form of little sacs on each side of the subœsophageal ganglia, containing granules of lime (otoconites) which vibrate in a clear liquid; but how sensitive these are to sounds is not well known.

The sense of taste may be present; and that there is a sense of smell is undoubted. It is probable, indeed, that this sense is the most active and serviceable of all the perceptions of these mollusks, and it is believed to reside in the region of the mouth.

Sensitiveness to touch is delicate in all parts of the skin, which responds to the slightest irritation; yet little if anything is felt of what we call pain, for a slug may be mutilated without exhibiting any symptoms of painful disturbance, and a breaking of the shell is not only easily and frequently repaired, but the loss of large parts of the body will be quickly replaced. Spallanzani, whose experiments with bats are celebrated, was the first to ascertain that not only parts of the head, but even the whole head, might be reproduced, although not always. "It is well established by experiments



The Common White-lipped Snail

on thousands of helices that the eye peduncles, when cut off, grow out again—that considerable parts of the locomotive disk may be amputated, and the new parts immediately bud out and supply their place."

Some snails, moreover, practise self-mutilation as a means of protection. This is reported of *Stenopus,* a West Indian genus, and is highly characteristic of the Philippine snails of the genus *Helicarion,* as described by Semper in *Animal Life.* The several small species live upon trees in damp woods, where they are numerous and active, and consequently much exposed to attack by reptiles, birds, and other enemies. Every species seems to have the property of shedding the tail whenever it is roughly seized. "This they do by whisking the tail up and down with extraordinary rapidity, almost convulsively, until it drops off; if the creature is held by the tail, it immediately falls to the ground, where it easily hides among the leaves. . . . Now, this hinder portion of the foot is the most conspicuous part of the snail's body, and it may be supposed that it, in most cases, is the part first seized by the reptiles or birds that prey upon them."

Professor Semper found that a large proportion

of all the species of *Helicarion* he met with showed signs of this self-mutilation; and furthermore that there seemed a tendency among various other species of snails of the Philippines towards a protective mimicry of this queerly fortunate genus.

The pulmonates unite both sexes in one individual, but it requires the mutual union of two individuals to fertilize the eggs. The eggs are laid in May or June, when large numbers of snails gather in sunny places. When about to lay, the snail burrows into damp soil or decaying leaves, underneath a log, or in some other spot sheltered from the sun's rays, and there drops a cluster of thirty to fifty eggs looking like homœopathic pills. Three or four such deposits are made and abandoned. This is the ordinary method of the genus *Helix*, but some of the land and all the pond snails present variations. The ova of slugs are often attached by the ends in strings, like a rosary, and many deposits are made during the year. *Bulimus* and other South American genera isolate each egg, which in the case of some of the largest species is as big as a pigeon's. *Vitrina* and *Succinea* glue them in masses upon stones and the stems of plants, while the tropical *bulimi* cement the leaves of trees together to form nests for their progeny.

The pond-snails hang little globules of transparent gelatine containing a few eggs, or otherwise secure their fry to wet stones, floating chips, and the leaves of aquatic plants. In *Neritina,* a brackish-water inhabitant, the ova, immediately upon being laid, become attached to the surface of the parent's shell, and when the embryo hatches each egg splits about the middle, the upper part lifting off like a lid. In most other cases the young gnaw their way out of the shell. Lastly, the eggs of the stout river-snails of our Western lakes and rivers are not laid at all, but the embryos hatch out in the oviduct.

"The number of eggs produced," remarks Dr. Binney, "varies in the genera and species in the same proportion as the dangers to which they are exposed are greater or less. Thus, in the naked genera, whose means of protection and whose chances of preservation are much less than of those protected by an external shell, the number is much greater than in the latter."

Our slugs lay several hundred eggs each season, ovipositing at intervals all summer.

Under the microscope the translucent egg envelopes present a beautiful appearance, being studded with glistening crystals of lime, so that the

infant within seems to wear a gown embroidered with diamonds. Ordinarily the young snail gnaws his way out in about twenty or thirty days after the laying of the egg; but eggs laid in the autumn often remain unchanged until spring; and, indeed, may keep many years if they remain cool or dry. The vitality of snails' eggs almost passes belief. They have been dried so completely as to be friable between the fingers, and desiccated in a furnace until reduced to almost invisible minuteness, yet always have regained their original bulk upon exposure to dampness, and the young have been developed with the same success as from eggs not handled.

"The young animal gnaws its way out of the egg, and makes its first repast on the shell it has just left. It consists at first of about one and a half whorls, the umbilicus being minute but open. Its growth is rapid, and it has usually increased in magnitude three or four times before the close of the first year. . . . The growth of slugs is remarkably rapid. We have known the young to double their size and weight within a week. Individuals kept in confinement and fully fed reach a much greater size than when in their natural condition." So says Mr. W. G. Binney.

More or less wholly dependent on moisture, the young snails at once seek out their retreats, and must be looked for under leaves, logs, and loose stones in the woods and pastures. Most American snails are solitary and belong to the forests, though the civilization of the country has caused noticeable changes in this respect, and has caused not only a spread of some species, but has induced them to come into the open more than was formerly natural to them. Look for them at the roots of fern-tufts, lurking in the moss beside mountain brooklets, hiding in the crevices of rocky banks and old walls, crawling over the mud at the edge of swampy pools, creeping in and out of the crannies of bark on aged trees, or clinging to the under side of the leaves. Some forms are so minute that they might be encircled by the letter *o* in this print, yet you will soon come to perceive them amid the grains of mud adhering to the lower side of a soaked chip or exposed by an overturned log.

For fresh-water species, various resorts are to be searched. Go to the torrents with rocky bottoms for the paludinas and periwinkles (*Melania*); to quiet brooks for physas and coil-shells; for limneas to the reeking swamps and stagnant pools in the wet ooze. I know no better place in the world

for pond-snails than the tule marshes of the Pacific slope, where hundreds of the great, graceful *Limnea stagnalis* lie among the rotting vegetation or float upside down at the surface of the still water. But some of the fresh-water mollusks remain most of the time at the bottom, coming to the surface only to breathe now and then; and to get their shells it is necessary to use a sieve-bottomed dipper or some sort of dredge. When the water becomes low they bury themselves in the mud; it is therefore always profitable, late in the summer, to rake out the bottom of mud-holes where the water has entirely disappeared. Another plan is gently to pull up the water-weeds by the roots and cleanse them in a basin of water. You will thus secure many very small species. Experience will quickly teach the collector where he may expect to find this and that kind, and that some caution and much sharpness of observation are necessary, since some species by their naturally dead tints, and others by a coating of mud, assimilate themselves so nearly to their surroundings as easily to be overlooked by man as well as other enemies.

The shell is increased rapidly for the first two or three years, and the delicate lines of increment, parallel with the outlines of the aperture, are readily

visible on all the larger specimens. Various other signs indicate youth or adult age in the shell.

Mollusks prosper best, other things being equal, in a broken landscape, with plenty of lime in the soil. The reason, no doubt, why the West India Islands, the Cumberland Mountains, and similar regions are so peculiarly rich in shells of every sort is that a ravine-cut surface and a wide area of limestone rocks characterize those districts; on the other hand, it is not surprising that I found nine-tenths of the Rocky Mountain species to be minute, since the geology is represented by sandstone and volcanic rocks.* Hot springs are very likely to be inhabited by mollusks, even when the temperature exceeds 100° Fahr. and the waters are very strongly impregnated with mineral salts.

Snails are mainly vegetarians, and all their mouth-parts and digestive organs are fitted for this diet. Just beneath the lower tentacles is the mouth, having on the upper lip a crescent-shaped jaw of horny texture, with a knife-like, or sometimes saw-like, cutting edge. The lower lip has nothing of this kind, but in precisely the same attitude as our tongue is arranged a lingual mem-

* See Dr. Hayden's *Report of the United States Geological Survey*, 1874, and *Popular Science Monthly*, July, 1875.

brane, long, narrow, and cartilaginous, which may be brought up against the cutting-edge of the upper jaw. This "tongue" is studded with rows of infinitesimal silicious "teeth," eleven thousand of which are possessed by our common white-lipped helix, although its ribbon is not a quarter of an inch long. All these sharp denticles point backward, so that the tongue acts not only as a rasp, but takes a firm hold upon the food. On holding the more transparent snails up to the light it is easy to see how they eat, and you can hear a nipping noise as the semicircular piece is bitten out of the leaf. Their voracity often causes immense devastation, particularly in England, where the great, gray slugs will ruin a garden in one night if the gardener is not daily on the watch. Our own strawberries sometimes suffer, but a border of sawdust, sand, or ashes around the bed is an adequate protection in dry weather. In trying to cross it, the marauders become so entangled in the particles adhering to their slimy bodies that they exhaust themselves in the attempt to get free. They also are very fond of fungi, including many poisonous kinds.

At the first hint of frost our snail feels the approach of a resistless lassitude, and, creeping under

some mouldering log or half-buried bowlder, it attaches itself, aperture upward, by exuding a little glue, and settles itself for a season of hibernating sleep. Withdrawing into the shell, the animal throws across the aperture a film of slimy mucus, which hardens as tight as a miniature drum-head. As the weather becomes colder, the creature draws itself a little farther in, and makes another "epiphragm," and so on until often five or six protect the animal sleeping snugly coiled in the deepest recesses of his domicile.

This state of torpidity is so profound that all the ordinary functions of the body cease—respiration being so entirely suspended that chemical tests are able to discover no change from its original purity in the air within the epiphragm. Thus the snail can pass without exhaustion the long, cold months of the North, when it would be impossible for it to secure its customary food, just as

"The tortoise securely from danger does dwell
When he tucks up his head and his tail in his shell."

The reviving sun of spring first interrupts this deep slumber, and the period of awakening is therefore delayed with the season, according to the varying natures of the different species. A few species,

however, seem to hibernate very little; *Vitrina*, for example, may be seen active in pretty cold weather, and even crawling about in the snow, while the finest American specimens live high up on the Rocky Mountains. At any time, nevertheless, an artificial raising of the temperature breaks the torpor, the warmth of the hand being enough to set the heart beating. Extreme drought also will cause snails to seal their doors hermetically, without even hanging a card-basket outside. This is to shut off the evaporation of their bodily moisture, and happens in midsummer; hence it is termed æstivation. Certain carnivorous foreign slugs (*Testacellidae*) which have no shells, protect themselves under the same circumstances by a gelatinous appendage of the mantle, which, in case of sudden change of temperature, can be extended like an outer mantle, so to speak, from its place of storage under the "buckler." Having enwrapped themselves, they burrow into the soil.

Snails are found in the most barren deserts and on the smallest islands all over the globe, reach near to the line of permanent snow on mountains, and are restricted only by the arctic boundary of vegetation. There is a great difference between the snails of the tropics and those of high latitudes—

size, number of species in a given district, and intensity of color decreasing as you go away from the equator; but this statement must be taken in a very general sense. Different quarters of the globe are characterized by special groups of land mollusks as of other animals—thus, *Achatinella*, with three hundred species, is confined to the Sandwich Islands. But *Helix*—the true snail—with its many subgenera and two thousand species, is absolutely cosmopolitan. The fresh-water forms, also, are spread everywhere, except in Australia, and flourish in cold countries, *Pupa* having the hardihood to live nearer the north pole than any other known shell. Yet it is a remarkable fact that, however erratic and extensive may be the range of the genera to which they belong, the majority of the species of pulmonates of all sorts have an extremely limited habitat, in some cases comprising only a few square rods; and here they seem to have a certain favorite resting-place, or "home," to which they return after feeding excursions. A second noteworthy fact, obtaining in no other extensive group of animals, is that many more species of land shells exist in the islands than on the continents of the world. Mr. A. R. Wallace accounts for this curious fact by explaining how certain

influences make long-separated islands more productive of mollusks than are continents, and at the same time deficient in enemies to snails.

How has this curious distribution come to pass? How have seemingly impassable barriers been overcome, so that closely related forms are now found at the antipodes?

Snails are of domestic tastes. "The heathen painted before the modest women's doors Venus sitting upon a snail, *quae domi forta vocatur*, called a house-bearer, to teach them to stay at home and to carry their houses about with them." They are also slow of pace, as a list of poets are ready to stand up and testify; but they have had a long time in which to "get a good ready," first to start, and afterwards to accomplish their travels, since their existence as a race goes back to when dark forests of ferns waved their heavy fronds over the inky palæozoic bogs. Distance disappears in the presence of such prodigious time. Lands like our Western plains, now an arid waste impassable to mollusks, were clothed in bygone ages with dense and limitless verdure, where every form of terrestrial life abounded. Between the present and the time of the laying down of those sandstones that make the soil of our level plains, the Rocky Mountains have

been elevated from an altitude at which any mollusk could probably have lived upon their summits to one that makes them a barrier to many species. Such changes may have happened anywhere, again and again, and thus the two halves of a community been divided. In succeeding centuries the members of the parted sections may have diverged in their development, until on this side of a mountain range, or desert, or sea, we now find one set of species, and on that side another set, which belong to the same genera, and may in some cases be proved, as well as surmised, to have had an identical origin.

But the main explanation of their dispersion is undoubtedly to be found in a much more recent land connection between various islands of present archipelagoes, and between these and the neighboring mainlands. It has been pretty satisfactorily demonstrated that during the glacial period the oceans must have been drained of water representing a universal depth of one thousand feet, in order to construct the enormously thick ice-caps which covered the polar hemispheres. This would expose a vast area of shallows, before and since deeply submerged, across which snails might easily migrate to other latitudes; when, at the end of the

glacial period, the melted ice reclaimed the shallows, the snails would be left colonized upon the high points now widely separated by water.

More casual circumstances have always contributed to this world-wide distribution. Snails frequently conceal themselves in crevices of bark, or firmly attach themselves to branches and foliage, and thus might be drifted long distances, since they are able to resist starvation for an immense period, and to protect themselves against injury from salt-water or excessive heat by means of opercula and epiphragms; violent storms might frequently transport living shells a considerable distance, and aquatic birds do carry them and their eggs from pond to pond attached to feet or plumage.

The astonishing vitality of the snails in every stage of existence favors the theory that they endure such accidental means of travel and thrive at the end of it. Edward S. Morse records that he has seen certain species frozen in solid blocks of ice afterwards regain their activity; and others enduring an equal extreme of heat without any bad effect. They have been shut up for years in pill-boxes, or glued (seven years in one case) to tablets in museums, and yet a trifle of moisture has been suffi-

cient to resuscitate them. They survive so well being buried in the ballast of ships that at almost every sea-port you may find species imported in that way, which came to life when the ballast was dumped at the time of unloading, and very likely they find their home-plants growing near equally the subjects of accidental importation.

Such are some of the methods of dispersion.

As to the longevity of snails, little is known, but some individuals no doubt attain great age. Some species of *Cylindrella* have a habit of deserting the point of the spire of their long, slender shells as they grow old, which abandoned portion speedily becomes dead, and cracks off upon the least injury. The sign of a perfect adult shell in these species, therefore, is that it is broken. Mr. Thomas Bland, the distinguished student of West Indian conchology, discovered this curious fact. After the cylindrella has thus voluntarily left the upper part of the shell, it builds a partition across behind it, and other mollusks are often driven to a similar expedient by accident or the decay of extreme age. This is called decortication, and is almost always to be seen in the beaks of the larger unios, or fresh-water mussels, of our inland rivers, as well as in many spiral univalves that live in swift-run-

ning water, where the bottom is rocky, such as the members of the families *Viviparidae* and *Strepomatidae*. All such alterations are gradual, and imply a comparatively long life.

Another curious thing is to be noticed in this connection: whole species sometimes suddenly die out. Not only a conchologist, but any one travelling through certain parts of our western territories, must be struck by the prodigious quantities of dead snail-shells scattered over the ground. These are the *Helix cooperi*, of which a few are still living in nooks and corners of the mountains. They are of all sizes, degrees of variation, and ages, and lie bleached in millions on the surface of the ground. Mr. E. L. Layard, in a letter to the London *Field*, mentions a precisely similar case in Mozambique and another in Fiji. Why have these species thus suddenly become extinct?

Snails, being great eaters, meet their just reward in being eaten. The paludine forms are sought after by all sorts of water-birds, particularly ducks and rails; while some tropical thrushes and other birds crush the shells of the land snails and extract their juicy bodies. Few birds, however, will eat the naked-bodied slugs; the slime sticks to their beaks and soils their feathers; but the ducks seem

to have no such dainty prejudices. Some mammals, like the raccoons and wood-rats, also eat them; insects suck their juices, and the carnivorous slugs prey upon one another. Lastly, man, the greatest enemy of the brute creation, employs several species of snails for culinary purposes. By the Romans they were esteemed a great luxury, and portions of plantations were set apart for the cultivation of the large, edible *Helix pomatia*, where they were fattened by the thousand upon bran sodden in wine. From Italy this taste spread throughout the Old World, and colonies of this exotic species, survivors of classical "preserves," are yet found in Great Britain where the Roman encampments were. They are still regarded as a delicacy in Italy and France, the favorite method of preparation being to boil in milk, with plenteous seasoning. Frank Buckland says that several of the larger English species are excellent food for hungry people, and recommends them either boiled in milk, or, in winter, raw, after soaking for an hour in brine. Dr. Edward Gray stated, a few years ago, that immense quantities were shipped alive to the United States "as delicacies"; but I am inclined to consider this an exaggeration growing out of the fact that among our fancy groceries "a

few jars of pickled snails, imported from Italy," figure as a curiosity rather than something needed for the table; nevertheless, they are frequently served at French and Italian restaurants in both New York and London. The same author records that the glassmen at Newcastle once a year have a snail feast, collecting the animals in the fields and hedges on the Sunday before. Thousands are collected annually and sent to London as food for cage-birds.

Mr. W. G. Binney, for whom a syrup of snails was prescribed by two regular physicians in Paris in 1863, points out how old is the belief that land mollusks possess valuable medicinal qualities. In the Middle Ages the rudimentary shell of the slug acquired a high rank among the numerous bezoars and amulets which were supposed to protect the body from evil influences, and to impart health and activity. The accounts of these virtues, copied from one author to another, have perpetuated the early superstitions until it is difficult to overcome them by the light of the present day, when, even in England, snails are supposed to possess a useful power in cases of lung trouble. A full relation of all the absurdities which gained credence would form a curious and marvellous

page in the history of credulity. They have, also, from very early times, been used in the preparation of cosmetics; and no longer than two or three centuries ago the water procured from them by distillation was much celebrated, and employed by ladies to impart whiteness and freshness to the complexion. Finally, I hear there is celebrated in Rome, even now, a midsummer festival, upon which occasion all family feuds may be made up, or any differences between friends easily adjusted, since that is the spirit of the day; and a sign or token of this renewed friendship and good-will is the present of a snail from one party to the other, or an exchange of mollusks between them. The symbolism and virtue reside in the alleged amicable influence of the head and "horns," to account for which some very quaint history and ingenious theories have been brought forward by the comparative mythologists.

In this country no such fanciful notions have ever gained credence. Our snails are too habitually hidden to attract the attention of any but a few; and, even when their existence is known, they are unfortunately regarded with such a disgust as would preclude any acceptance of them for either food or medicine.

Yet why this disgust? Snails are of ancient race, vast variety, graceful shape and dignified bearing, industrious and peaceful habits, edible and curative properties: *quod erat demonstrandum!*

XVIII

A FLICKER AND HIS FUN

AT length the summer's eternity is ushered in by the cackle of the flicker among the oaks on the hillside, and a new dynasty begins with calm security."—*Thoreau.*

I DO not know any American bird that has so many local and popular names as the flicker, which the books call the golden-winged woodpecker.* This comes from his having so many personal characteristics that attract attention, and from the

*Some of these local names are borrowed from Europe—that is, were applied to the bird by early colonists because of a real or fancied resemblance to some bird which they knew

fact that he is known all over the continent east of the Rocky Mountains. He extends his summer travels even to Alaska, and this is rather surprising, because he is no great wing-master, but,

in the fatherland, and often they involve a great mistake, ornithologically; others have originated here, so far as we can see. They may be divided into four classes, as referring: 1. To the voice; 2. To appearance; 3. To breeding habits; 4. To other characteristics.

Under the first head comes the common name *flicker*, now extended to the whole group *Colaptinae*, including several other tropical American species of *Colaptes*, the ground-flickers of South Africa (*Geocolaptes*) and those of the open plains of South America (*Soroplex*). "Flicker," often and rapidly uttered, is a fair rendering of the exuberant spring call of the bird. Other attempts at imitating this cry are *yucker* (New York, and mentioned in Jefferson's *Notes on Virginia*), *yarrup*, *wake-up*, or *wah-cup*, *pi-ût* or *pee-ût*, *caveduc* or *ometuc* (Maine), *yaffle* and *clape*. The name "*yaffle*," or "*gaffle*," still heard in Connecticut, is no doubt borrowed from a provincial (Surrey) name of the common green woodpecker of Europe, which is noted for its loud cry believed to forebode rain. "Clape," formerly, if not now, used in western New York, is of obscure origin; DeKay says of it only that it was introduced by the early immigrants to that region. There is an obsolete English word, *clepe*, meaning a loud call, or cry, which is connected with the old verb *clepe*, whence the archaic participle *yclept*; and, moreover, I find in an English dictionary in my possession, published in 1731, the verb *fliker*, "to laugh wantonly or scornfully," which would be a fair description of the American flicker's yell, though hardly to be supposed connected with

like other woodpeckers, goes swinging along, low down, in a series of wave-like leaps through the air, opening and shutting his wings at intervals in a leisurely style, as different from the rapid strokes

its name. As to the next mentioned, Nuttall has a pertinent note in the second edition of his *Manual* of ornithology (p. 665) as follows: "They have also a sort of complaining call from which they have probably derived their name of *pee-ùt, pee-ùt ;* and at times a plaintive *quêàh, quêàh.* Occasionally they also utter in a squealing tone, when surprised or engaged in amusing rivalry with their fellows, *we-cogh, we-cogh, we-cogh, we-cogh,* or *wecup, wecup, wecup.*" Kalm mentions "pi-ut," as in use in southern New Jersey a century ago.

The bird's appearance gives us the book names *golden-winged* and *yellow-shafted* woodpecker; *yellow-hammer* (widely prevalent in the northern parts of the Union), *partridge-woodpecker* (northern New York), *pigeon-woodpecker* and *wood-quoi* or *wood-queh* (Connecticut), *yellow-jay* (Northwest), *pique-bois jaune* (Louisiana), and *woodpecker-lark* or *lark-woodpecker* (South). In "yellow-hammer" we have what at first glance seems simply *yellow-hammerer;* but this is the name in Great Britain of several small birds of yellow plumage, and comes directly from ancient English language-sources. "Partridge" woodpecker is in allusion to the speckled colors; but perhaps "pigeon" woodpecker should not be classified here, since it may have referred in the beginning to the bird's manner of flight and habit of perching crosswise on a branch, where its attitude and appearance are not unlike those of a pigeon. "Wood-quoi" (pronounced *wood-queh*) is evidently the same thing, a common name of the British ring-dove being wood-quest; unless, indeed, it refers to the voice. (See Nuttall's note, quoted above). "Lark-

of a blackbird as is skating from running. I should not wonder if this were the easier, as certainly it is the more graceful way of the two.

woodpecker," notes the resemblance of the crescent on the breast to that of the meadow-lark (*Sturnella magna*). *Tapping-bird* (Massachusetts) refers to its intermittent flight, as if measuring off spaces. "Ant-bird" (Minnesota) refers to its fondness for ants.

The nesting-habits of the bird give us the widely prevalent *highhole* and *highholder, woodwall, wild-hen,* and *hittuck.* "Woodwall" is also a British name for the green woodpecker. "Wild-hen," is due to the fact that the bird will continue to lay eggs indefinitely after her nest has been robbed, like a domestic hen. "Hittuck," or "hittock," though now a Canadian term, appears to have been handed down from the Delaware Indians (unless, indeed, it is an imitation of the note), since Heckewelder says that *hittuck* was the Lenni-Lenape word for tree, and also that the Swedes, who colonized the lower Delaware valley in the seventeenth century, gave the name *tree*-peckers to this whole race of birds.

Among terms of miscellaneous origin are *fiddler* (Cape Cod), *English woodpecker* (N. E. coast), and *shad spirit.* The explanation of the last is found in a half-superstitious idea of the New England fishermen of former days, that this bird came up from the South and ascended the rivers just ahead of the vernal migration of shad, in order to inform the people of the approach of the fish; it is the noting of a coincidence, in other words.

I first called attention to this great diversity of vernacular names in *The Auk* for 1883; and the subject has been more extensively treated by F. L. Burns, in *The Wilson Bulletin,* No. 31, 1900.

The wing-quills are shining yellow, like tubes of polished gold, and as they are alternately displayed and concealed in this undulatory progress they shoot out flashes of light pretty to see.

There need be no difficulty, however, in recognizing the flicker. Other woodpeckers are purely black and white with scarlet trimmings. This one, which is of medium size, has a back of mottled brown and black, glossed with olive-green, and ornamented by a red crescent on the nape of the neck and a white patch on the rump, conspicuous in flight and distinctive. The throat is pale brown, with a black crescent hung across the breast; below this the body and thighs are spotted with black, while the under parts of the wings and tail are bright yellow. The flickers of Texas and the great plains have red instead of yellow quills, and much cinnamon in the plumage of the back; and a series of specimens shows how, as you go west from the Atlantic coast, you find more and more red taking the place of the characteristic yellow parts, until the latter color is wholly replaced by it. "What is the cause of this change?" That is one of the unanswered questions in ornithology.*

* Further consideration induces me to put into a foot-note what ornithologists have to say on this point, because it is

But his dress is one of the least of the flicker's diversities from his family type. This independent cousin does not at all mind sitting crosswise upon a branch, like a pigeon or any other percher, whereas good form in the Picus family requires its members to cling upright, with equally distended toes and the tail pressed in against the bark as a support. A flicker also possesses this climbing-irons kind of a tail, and spends a fair share of his time in scrambling up and down tree-trunks and fence-posts in search of the worms, wood-lice, and

a problem of no small importance. It is a common thing in birds to find the males and females differing decidedly in color, and the young differing from adult specimens or the same birds altering with change of season; but apart from this there is a condition called *dichromatism* (sometimes it seems to be even *trichromatism*), which is quite another thing, and as yet not well explained. In dichromatism, one species presents two different styles of permanent and normal colors or styles of coloration. Examples of these are found in certain parrots, which may be either red or green, in some American hawks and sea-birds where both light and dark colored individuals regularly occur, and in many owls, most commonly the familiar little screech-owl (*Megascops asio*), where gray and reddish ones will grow up in the same nest. Thus many birds, formerly regarded as separate, have been shown to belong to one and the same species whose members are sometimes in one dress and sometimes in another equally normal. In the light of this fact Dr.

other insects lurking in crevices or under the loose bark of such trees as the apple, oak, sycamore, and "shingly shagbark"; but his feet are so different from those of his cousins that he finds it easy to perch crosswise on a bough, as few other woodpeckers are able to do.

The Picus family is a tree-loving clan, so much so that its members disappear to a great extent from a region whose forests have been cut down. Thus the beautiful great ivory-bill is now probably wholly extinct, though formerly it extended all over the Gulf States and lower prairie country,

Leonhard Stejneger, of the Smithsonian Institution, discussing the subject in the introduction to the "Birds" volume of the *Standard Natural History*, has suggested that the relations of the two species of Colaptes, the Eastern yellow-shafted (*C. auratus*) and the Western red-shafted (*C. mexicanus*), and their puzzling intermediate forms may possibly be thus explained; and further suggests that the intermediate examples of the Lower Mississippi Valley, sometimes called *Colaptes hybridus*, having a red crescent and mustache, may be the original stock, which, westward, became modified into *mexicanus*, eastward into *auratus*, the isolated individuals with mixed characters being due to atavism, or, in occasional instances, to hybridization. A point which seems to strengthen this view, Dr. Stejneger adds, is the fact that there exists another yellow-shafted species with red mustacial stripe and red nuchal crescent—namely, *Colaptes chrysoides*.

and the gaudy red-head has become uncommon east of the Blue Ridge.

Our friend, the flicker, however, takes the world as he finds it, and perhaps fares even better among the partial clearings, orchards, and shaded roadways left to him by civilization than he might in primeval forests. He is even adaptive enough, now and then, to bore a hole in a barn-timber, or even to save himself that labor by taking possession of some accidental cavity about the farm buildings and rearing a brood there. As a rule, however, the pair like to chisel out their own fresh tenement each season; and sometimes will amuse themselves by digging in midwinter a beautiful cavity, which cannot be occupied for several months, and probably will be entirely forgotten. The eggs are pure white, enamelled on the surface like great pearls; and an extraordinary circumstance connected with the bird's breeding is that if the eggs be removed, one by one, the hen will continue laying indefinitely. It is on record that one pair, cruelly tested, laid seventy-one eggs in seventy-three days before ceasing. They are ordinarily more prolific than other species, raising from six to ten at a brood, and thus sustaining their race against the constant shooting to which they are

exposed by their conspicuous size and colors and their boldness in visiting orchards and other places near the haunts of mankind.

This woodpecker differs largely from others in his food. His curved beak is less well adapted to digging grubs and boring insects out of wood than are the straight pickaxes of the others, and he seems to get nearly all his food from the ground or from logs and stumps, taking in a good deal of grit in the process.

Professor F. E. L. Beal, who has made a special study of this bird's food for the Department of Agriculture, learns that about a quarter of its food consists of berries, grain, and seed—a far larger proportion than any other woodpecker is known to make use of. The remainder of the food is made up of insects, chiefly ants, which constitute more than half of the whole. Next in importance are beetles, chiefly those dwelling upon or in the ground; grasshoppers and crickets; and various other forms, including spiders and myriapods, but not many caterpillars or grubs.

This peculiarity of fare goes with a peculiarity of tongue in this woodpecker, which is rather thicker and longer than that of other species, and is capable of being thrust out of the mouth to an amaz-

ing distance, owing to the great length of the extensile tongue bones, which, when the mouth is closed, slip back into the sheaths that curve over the back of the skull on each side and forward almost to the forehead. The tongue has little of the horny and barbed character at the tip, so serviceable in other woodpeckers for spearing insects and grubs and drawing them forth from hiding-places in bark or decayed wood, but instead its sides and upper surface are plentifully coated with small, backward-pointing spines and papillæ. "The members of the genus," remarks Mr. F. A. Lucas, in an article describing the structure of woodpeckers' tongues, "are particularly fond of ants, and the tongue seems especially adapted for exploring ant-hills. The function of the fine points on the upper part of the tongue seems to be to form a rough surface to which the sticky saliva will readily adhere, and to which in turn the ants will be stuck. In this genus the submaxillary salivary glands reach the maximum size in the group."

The fondness of the flicker for ants is extreme. Professor Beal found more than three thousand by actual count in some of the stomachs he examined. "These were mostly small species that

live in burrows in the earth, so that it is evident that when flickers are seen upon the ground they are usually in search of ants." The same ornithologist points out that on the whole this is beneficial to mankind, because many sorts of ants are harmful to cultivated trees and plants, on account of their attending and preserving the injurious plant, root, and bark-lice. Some ants, especially in warm climates, do much harm in other ways, so that anything which checks their increase deserves our thanks.

When engaged in these unwoodpecker-like researches upon the ground the flicker is very silent and watchful, as if he felt it both *infra dignitatem* and perilous. He does not *walk* about, but hops along with a bounding, elastic gait, head up and eyes supernaturally vigilant. The greenish hue of his back would make him almost imperceptible in the grass did not the red half-moon behind his ears betray him. He ought to slip a hickory-nut shuck over his head when he goes abroad.

In August, particularly, young and old together go wandering in a loose company over meadows, turning over the dried droppings of cattle—two sometimes helping each other—in search of black

crickets and big beetles. Their bills are admirably shaped for this sort of work.

From Canada and the northern tier of the United States the flicker retreats in cold weather, but in the Middle and Southern States he stays the winter through, finding plenty of food. It is in search of the hollow places where insects hide themselves or their eggs that woodpeckers tap upon the trees, judging by the sound whether the wood is hollow or not. But the flicker seems also to drum a great deal as a means of conversation with friends, or just for fun. I suppose these birds must have a recognized code of signals. Bradford Torrey tells, in his *Birds in the Bush*, how once he noticed two or three flickers clinging to the trunk of a shell-bark hickory: "One was perhaps fifteen feet above the other, and before each one was a strip of loose bark—a sort of natural drumhead. First, the lower one 'beat his music out' rather softly. Then, as he ceased, and held his head back to listen, the other answered him; and so the dialogue went on."

In another place the same pleasant writer tells a pretty story of how, "hearing somebody drumming on tin," he peeped over the wall to see a flicker hammering an old tin pan lying in the middle

of the pasture. "Rather small sport, I thought, for so large a bird. But that was a matter of opinion, merely, and evidently the performer himself had no such scruples."

It looks to me as though this were done just for the amusement of it.

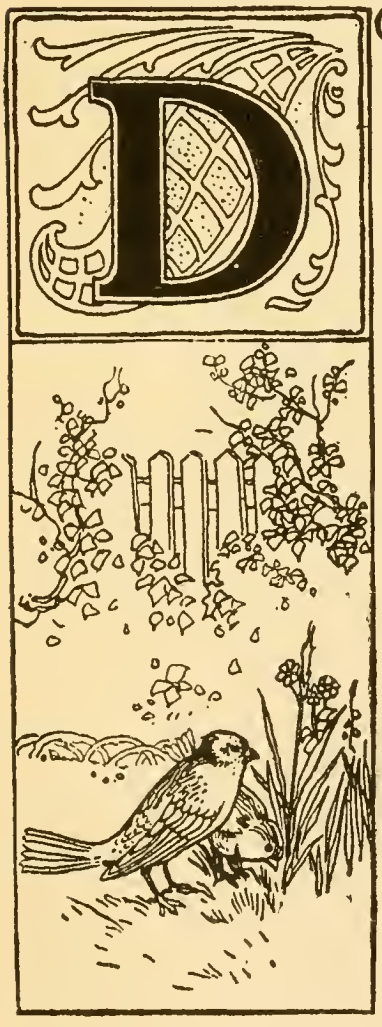
No bird is more exuberant when spring comes. He mounts a dead tree-top or the summit of a tall fence-rider and shouts and yells with glee. It is a loud, whole-souled, hearty "holler," which, as Audubon expresses it, is merriment itself, and imitates a prolonged, jovial laugh. Sometimes, nevertheless, the cry is nearer a scream, or the harsh noise made by sharpening a knife. It is in the joyous excitement of choosing a mate that this keen and sonorous call rings loudest across the blossoming fields, and then it is great sport to watch the antics of a group of golden-winged beaux, each striving to attract some coquettish maid who is slow to single out one of the noisy and quarrelsome crew.

It is during this time of courtship and domestic duty and joy that one hears oftenest those softer and sweeter notes of this bird, which sound like *wicka, wicka, wicka,* frequently repeated. It is a gentle, melodious utterance, with a curious crackle

in the tone; and it gives one a new and fonder feeling for the flicker—an affectionate regard that tinges pleasantly our admiration for the gay roysterer who at other times bids us shout back a cheery *holá!* to his wild field-cry.

XIX

THE YELLOW-THROAT'S GARDEN



DOWN below the high ledge upon which I sit comfortably in the shade of a hemlock is a little swamp that I am accustomed to call the Yellow-throat's Garden. It is in bigness not much greater than the zone of shadow that ancient oak swings about it in the circle of a summer day, but it is wonderfully crowded with life. How tropical it looks in the fulness of this late-summer fruition! The underbrush is thick with the feathery fronds of ferns—brake and lady-fern—and the royal osmunda; and above and among the leafy

brush of alder, black ash, and striped maple spread the curving palm-like branches of the sumachs—the red with its "stag-horn" tops, the yellow, whose blossoms are so richly redolent of beeswax, and the poisonous one. At the cleared edge of the patch, too, where the ditch is, grows that other pretty but pestilent *rhus*—the poison ivy. Right in among it a Maryland yellow-throat made his home and sang and shouted his "Where'd ye get it? What of it?" as long as there were eggs or fledglings in the snug basket sunk into the grass beneath the ivy's feverish shade; but he has not been heard for a month, and no doubt is now back in the State he is named for, or some other Southern haunt, telling tales, "'neath the jasmine's shade," of the little swampy thicket which was his summer resort, and whose full beauty he did not wait to see.

Do you not know the yellow-throat? He is a tiny, ground-keeping warbler, with a black, awl-shaped beak and pink-white legs, and with a jet-black mask across his forehead and along the sides of his head, through which his eyes peer with quizzical brilliancy; but this mask, by which he is so easily recognized, the ladies of his family are not permitted to wear, and even the gentlemen must

Nest of a Maryland Yellow-throat

forego it when they moult the gay plumage of the season of courtship and put on the travelling-dress for their annual migration southward.

These birds arrive unannounced at this swamp in the Hudson Valley some warm May morning, revealing their presence by the loud, inquisitive exclamation which so many persons have tried to render in English words, and at once begin prospecting every tuft of grass, every cluster of roots, and each square foot of the ditch bank to find a good site for a home. What things they must find! what reminiscences recount to old friends! Some acquaintances have stayed here all winter—the spotted turtle, for example, who is so much of a homekeeper that he is scarcely able to show even a momentary polite interest in tales of foreign lands; but the song-sparrow is wide-awake in his responses, and the travelled water-thrush is a sweet gossip. These garrulous friends smile with the satisfaction of returned wanderers as they hear again from the rocky hill-side the shout of the highhole; are puzzled for an instant to remember, as the queer, whistling chuckle of a crow-blackbird resounds across the valley, whether it is the voice of a bird or of a frog, and they shrink and hide when the shadow of that same old broad-winged hawk, so

much feared last year, once more falls upon the bushes, and the blue air is pricked by its piercing scream—miles above high C.

What hosts of birds June saw in this thicket while the yellow-throats were busily clearing out a little pit in the dry turf, weaving within it a strong basket of grass and weed-stems, and then furnishing it, bit by bit, with silken shreds. It is a visiting-place for rare warblers. In the greenish gray of the fresh-leaved bushes flit greenish-gray *Helminthophaga* fly-catchers, as noiseless and almost as invisible as ghosts. Restless ground-warblers explore the recesses of the old tussocks, watchful against snakes; and the loud scratching of a towhee startles for a moment an oven-bird, who, stepping daintily in silken stockings, is wondering whether our yellow-throat would be neighborly if she should make her domed summer-house near by. Over the maple-tops a tanager swings through the air like a volant ruby; while, sapphire-like, the indigo-bird poises at the apex of my hemlock, lilting a song that sparkles in the sunshine.

Beautifully and merrily the yellow-throat's nest is completed, and day by day through a hopeful week the tiny, red-spotted eggs are laid, and the young wife takes up her vigil of love upon them,

while her mate, with rare diligence and assiduity, brings her the insects he has captured, and now and then "spells" her at her brooding. The yellow-throat is a good hunter, loving to prowl about the edges of streams where insects abound, and to snatch them from grass-blade and leaflet, or pick them up from the ground. It is a pretty sight to see him work, and he is no mean assistant of the gardener; but he displays little of the aërial nimbleness of certain of his cousins, such as the redstart.

It is astonishing to watch an American redstart, poised on fluttering wings just over the long grass until he is a mere blur of yellow and black, trying to catch some agile gnat that has risen from the water. There is a contest of quick wits and muscles for you! Presently the bird succeeds, flings out his sharp *zee-zee*, and, darting up, alights upon a low horn-beam to swallow the morsel, whereupon the yellow-throat cocks up his bright eye and demands, saucily: "*Did ye get it? Did ye get it?*" The red-start rests a moment, then looks carefully around him. Suddenly he leaps out, circles a yard or two, and returns to his perch—a failure; but he has hardly touched it before he dives headlong to the ground, turns a somersault, his

bill clicks sharply, and I know that some gauze-winged mote has given its last buzz.

But all this was in June—juicy, noisy, impulsive June. July and August followed, with their serious work of bringing up fledglings in the way they should go, and the duty of perfecting the flowering and fruitage of growing plants; and, now that September is almost at hand, the thicket is a mass of all the flowering weeds that grow in moist places, and is a glory of color. Half hiding the poison ivy at the edges, and scattered in rounded masses all through the place, is the shining balsam-weed, or jewel-weed (*Impatiens fulva*)—the antidote with the poison; for we are told that a tea made of its leaves is an effective remedy for an attack of vegetable poison. I question the actual efficacy of this tea; but it is certain that the root of the plant has long held a high place in medical botany, whence the name balsam-weed.

I think both species are tangled together here, but, whether this is so or not, there is variety enough in the blossoms to furnish forth a dozen species. The form is pretty uniform, little cornucopias hanging with a broad lip downward, just as one would hold a tall ewer when pouring water. At the lower tip of the flower is a long, bent spur or hook, by which

the girls hang them in their ears, and so comes the name jewel-weed. Most of them are pure golden yellow or rich orange, splashed and spotted with deeper orange or blood-red; and the lip will be all of this intenser color; but on the same bush may hang blossoms that are yellow without spots, or half yellow and half white, or pure, unspotted white, or (prettiest of all) white suffused and spotted with pink, that glows rose-red on the lip. As I look at the rich red, pouting lips of these hundreds and hundreds of dangling jewel-blossoms, I think of the line "some bee had stung it newly," when, bizz! a big, white-bodied bee comes straight at the one nearest me, and, clutching it hard as it dips beneath his weight, climbs deeply into the pitcher, then backs out and darts away to another. But he has paid his toll. Above the red lip that attracted his notice is a bridle hanging over the corolla's mouth, and through it he must crawl to reach the drop of nectar that Nature has placed in the depths of the flower—the bait to her trap. His round, furry back presses hard against the top of the flower as he struggles in through this bridle and out again; and when he emerges it is dusted with white pollen that has been rubbed off the anthers that, with the pistil, form a firm little brush

there, just where he must rub against it. Ignorant or careless of this dust on his coat, he dives into another flower and wipes it off on the brush he finds there. Thus from flower to flower he carries an exchange of pollen and gives us an object lesson in cross-fertilization.

In the early morning the jewel-weed is not only studded with these pendants of gold, but incrusted with diamonds, for its leaves and stems gather a film of dew which clothes them in a lace-work of light. Put the leaves under water and they gleam as if coated with mercury, because the light is reflected from thousands of minute bubbles of air caught among the invisible hairs of the surface. The country people hereabout call the plant poor-man's-silver, on account of this frosted appearance when wet; and, remembering its golden blossoms, it might well be adopted as the badge of bimetallism. Another curious property of these blossoms appears when you lay them away in the herbarium; for, according to Dr. John Torrey, as related in his *Flora of New York State*, the dried plant gives to the paper in which it is kept an orange-colored stain which sometimes strikes through several sheets, and is of the exact color of the specimen. This is true, however, only of the jewel-

Jewel-weed

weed proper (*I. fulva*); its brother-species, the snap-weed or touch-me-not (*I. pallida*), will not show it.

But these are not the only blossoms here. Beside them stand the dull white umbels of the wild carrot, and over them bend the conspicuous plumes of dozens of Joe Pye weeds—the tallest and handsomest of the bonesets or hempweeds. Nothing is more interesting in the moist hollows all over this part of the country than this big, strong, showy plant, carrying heads of blossoms as big as a half-bushel measure. Close at hand each flower in the dense cluster is a tiny, lilac-pink thing, with two long, white threads extended for more than its length. Looking closer, you see that what you took for one flower is a tight bunch of half a dozen, and a dozen or so of these form a tuft, a great number of which compose the flower-head that attracts your attention. This explains why the deep, warm lilac seems hidden in a gauze of white; you see it through hundreds of waving pistil-threads. Nowhere have I ever seen these weeds in such luxurious masses, empurpling the whole surface of a swamp with their huge chrysanthemum-like heads, as at a little place far up the Hackensack River called Pye's Corners. I thought I had hit upon the origin of the curious name, which a botanist

had told me no one knew; but since then I have read in the *Flora of New York* that "the popular name of the plant is said to be that of an Indian who recommended it to the whites" for its medicinal value, the root being regarded as a cure for gravel. Nowhere is it or can it be more beautiful, I think, than I see it as I write, their pagoda-like columns half hidden in sprays of sumach, made almost transparent against the afternoon light, and a playground for humming-birds.

From what a flowery jungle they rise! Masses of grasses, sedges, docks, cat-tail flags; ferns, great and small, coarse and fine; herbs bearing tiny white and blue and pink and purple flowers; asters purple and white, and struggling clumps of golden-rod, waving level sprays covered with young flowers and looking exactly like miniature hemlocks after a yellow snow-storm, if you can imagine such a thing. None of the forty kinds of golden-rod with which we are blessed is more graceful and pleasing than this swamp variety.

How long a catalogue a botanist might make out of this quarter-acre of jungle, how many varieties he would find, how many an essay he might write, or scientific sermons could be preached, I hesitate to say. He would tell me, to begin with,

that I had forgotten some of the plainest and prettiest things—the tiny stars of the forget-me-not, floating on the dark waters of the ditch; the lythrum and another gaudy loosestrife; the great, crimson blossoms of the flowering raspberry, defying time and season, for the same bush bears a handful of big, sweetish fruit; and, ah! over there in the midst stand three, four, five spikes of the cardinal flower. They shoot up above the verdurous tangle that hides their roots, and flame like torches with a scarlet so vivid that as you look at them they tremble and grow indistinct in a flame of color.

XX

EASTER SKYLARKS

I COULD think of no more profitable, enjoyable, and reverential avocation for last Easter Day than to walk out into the country and listen to the skylarks, where they were chanting their little anthems under the blue dome of the divine sky.

It has been no news to bird-lovers in the neighborhood of New York that we had domiciled on Long Island the growing remnants of a colony of true English skylarks, which has survived the vicissitudes of guns and traps and climate (even the almost exterminating

blizzard of 1888) since its progenitors were set free in Greenwood a quarter of a century ago.

It was an exquisite day. The air quivered with light and sweetness. The suburban lawns were freshly verdant, the shrubs were clothed in a mist of pale green, the gummy buds of maple and hickory were bursting, the orchards melted atop into a haze of purple reflected from the newest twigs, the horse-chestnuts were unfolding five fingers from each softly doubled bud-fist, and overhead arched always an unblemished concave of tenderest blue, the sky that in the imaginative East gave us our very word *divinity.*

Pausing where broad fields stretched unbroken beyond the roadway and its houses, I stood and listened. A robin called, and blackbirds, unseen in the thicket, revealed their presence musically. Presently my attentive ear caught a tinkle of tiniest bells—an Easter carol rung by elfin fingers —coming and going uncertainly, but, little by little, stronger and more audible, until at last I could locate its silvery tintinnabulation. Still my eager eyes sought in vain for the invisible musician, searched the vibrant depths of the blue until power of vision was almost lost; and then the gurgling melody ceased, and I could rest and think.

I had heard the skylark—far away, and faintly; but even so, it was one of the rewards of life.

Behind me was a great cemetery where hundreds of sombre figures moved silently amid pallid marble and cold granite, or gathered here and there into groups in whose midst, as I knew, were open graves; and hearses, black and white, rolled back and forth, followed by carriages filled with weeping men and women, heedless now of the sunlight and of a sky glowing like a hollowed sapphire.

As I gazed from afar at this silent and pitiful spectacle of multiplied grief, suddenly there came again to my ears—to mine alone, on the edge of that desolate throng—the mystical, angelic anthem of the lark, and, turning, I caught sight of the singer. Forsaking the clods, he was winging his way up, up, into the purity of the glistening air, catching and reflecting its sheen as he rose, his swiftly fluttering pinions scattering a gem-like radiance—a halo of light—about him, his golden beak raining down gems of melody.

How he sang! now sinking, now gliding ahead, now turning to the right or to the left, but ever rising on tremulous wings by the very buoyancy of his emotions, ever lifted upward by the exaltation of his song.

One could not stop and consider what this song was like—compare it with the rich chorus of a bobolink, refined by art and prolonged into infinite variety, say it was this or that. Those clear, continuous, liquid, bubbling, hastening notes, dropping like a cascade of diamonds, pearls, and rubies from the galleries of the sky, were as ethereal as their source; and that flashing speck, ascending ever higher and higher, seemed to diminish, not by distance, but by dissolving its very self into dropping music.

Now the bird hovered over the city of the dead, and rained down upon the sad hearts there its heaven-sent message of comfort and hope and joy. None seemed to hear it, truly, but the lark sang on with higher purpose than to win applause, showering near and far its crystal music. So it poised under the vertex, like a day-star, for a moment, then glided gently, reluctantly, down a long, sunny azure slant to its mate and her loving approbation among the budding clover.

Perhaps the occasion and the place, and the sweet, poetic associations of the bird's name affected me, but as I saw that tiny, unheeded exile pouring out his heart on this Day of the Resurrection in the sweetest, purest strain that ever fell

from the brightness of God's heaven into the shadow of men's hearts, I thought there were few things in fact or story that could be more sublime. And yet they tell me that it is in the early morning that this, like other birds, tilts his noblest and sweetest lay—this "Lark that at heaven's gate sings!"

Up, up, from fields aromatic;
Up, up, chanting music chromatic,
Wings the skylark, on spiral ecstatic,
    Thinking only of singing,
    Pure melody ringing,
    Rapture down flinging,
        Careless who hears.

High, high, where the morning is newest;
High, high, where the deep sky is bluest,
Mounts the skylark, in worship the truest,
    Orisons making,
    Paradise waking,
    Earth's homage taking
        To heaven's great throne.

Clear, clear, is the air where the chorister floats;
Clear, clear, sparkle skyward his jubilant notes,
Responding to matins from angelic throats,—
    Seraph choirs singing,
    Golden harps stringing,
    Incense far swinging,
        To swell the lark's praise.

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